Marine Protected Areas and Marine Education:

A Case Study of Tasmania and Victoria

Risa Kasai

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Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any tertiary institution, and to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Risa Kasai

School of Geography and Environmental Studies
University of Tasmania
February 2006

Abstract

Throughout the world, Marine Protected Areas (MPAs) have been declared mainly for biodiversity conservation and scientific purposes. However, the establishment and management of MPAs has not adequately addressed their important educational benefits. Interpretation signs and dive trails can be found at educationally managed MPAs that encourage the public to deepen their knowledge on the relatively undisturbed local marine environment. Education at both school and community levels need long-term commitment, nevertheless it can generate appreciation and support for conserving the marine environment.

There are two aims for the thesis: to identify educational policies, strategies and opportunities to promote MPAs in Victoria and Tasmania; and to assess factors that could enhance MPAs for education purposes in Tasmania. In addition, four objectives were identified: to outline the development of MPAs at national and state levels; to review and analyse school and community based marine education programs in Victoria and Tasmania; to conduct a questionnaire and assess the degree of commitment of government and non-governmental organisations to marine education and MPAs; and to identify MPAs that could be used to support marine education for schools and the community.

Research questionnaires were distributed to key informants involved in MPAs and marine education in Tasmania and Victoria. The questionnaires were distributed in order to investigate existing marine education policies, strategies and programs, values and use of MPAs for educational purposes, resources for marine educational activities, impediments to their implementation and marine education programs for promoting the development of MPAs.

The conclusion shows that despite a recent increase in concern about the marine environment, the development of marine education policy and programs through the declaration of MPAs has been inadequate in Tasmania. The study recommends the designation and expansion of a number of Tasmanian MPAs for educational use.

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Chapter 1

Introduction

1.1 Australian Marine Environmental Issues and Marine Protected Areas

Australia has one of the longest coastlines[1] in the world and about 75 per cent of the population live within 50 kilometres of the coast (National Oceans Office [NOO] 2002). Australia's marine jurisdiction is greater[2] than the size of the continent and extends from the tropical regions of the Pacific and Indian Oceans, which include coral reefs and mangroves, to the temperate Southern Ocean, which supports unique marine ecosystems (Edyvane 2005; IMCRA Technical Group 1997). Zann (1995) argues that, in general, Australia's marine environment is in good condition compared to other developed countries. However, deterioration of the marine environment, especially close to cities, has been significant. The following five concerns for Australia's marine environment have been identified:

1. declining marine and coastal water/sediment quality, particularly as a result of inappropriate catchment land use practices;
2. loss of marine and coastal habitat;
3. unsustainable use of marine and coastal resources;
4. lack of marine science policy and lack of long-term research and monitoring of the marine environment; and
5. lack of strategic, integrated planning in the marine and coastal environments (Zann 1995: n.p.).

In order to minimise these human effects and deterioration of the marine environment, three principal conservation methods have been developed (Kelleher and Kenchington 1991). The first approach identified is to regulate individual marine activities, for example commercial fishing. The second is the establishment of small Marine Protected Areas (MPAs) for particular conservation purposes. The most recently introduced

[1] Approximately 32,000 kilometres (IMCRA Technical Group 1997).
[2] Australia's Exclusive Economic Zone (EEZ) extends approximately 9 million square kilometres of seas (16 per cent larger than the land) (IMCRA Technical Group 1997).

approach is the third one, which supports the creation of large, multiple use MPAs. Although problems with boundaries and overlapping management have been identified, these larger MPAs can provide wider protection of marine biodiversity whilst allowing sustainable human use.

As it is argued, establishing a representative system of MPAs has been recognized as one of the most effective tools to protect the marine environment and promote sustainable use of natural resources both nationally and internationally (Cicin-Sain and Belfior 2003; Wilkinson *et al.* 2003). To fulfil Australia's commitment to international agreements, such as the Convention on Biological Diversity 1992, and recognising the necessity to develop MPAs for protecting marine and coastal environment in Australia, the Commonwealth and state/territory governments developed a joint initiative entitled the *National Representative System of Marine Protected Areas* (NRSMPA) (ANZECC 1999; IMCRA Technical Group 1997). The NRSMPA is one of the essential elements of a 10 year marine conservation program entitled *Ocean Rescue 2000* that was launched in 1991 by the Commonwealth Government (DPIWE 2000; Kriwoken 1996).

MPA strategies developed by each jurisdiction clearly state the primary and the secondary goals of establishing MPAs include:

- biodiversity: to protect representative, unique, rare and endangered ecosystems and species;
- fisheries: to safeguard fish propagation and support recovery from over-fishing;
- science: to provide pristine environments and samples, for research and understanding the natural ecosystem; and
- society and culture: to support tourism and recreation, to enhance educational opportunities and to protect historical sites such as shipwreck spots (ANZECC 1999; DPIWE 2000; Edyvane and Lockwood 2005).

Regarding the ecological aspects of MPAs, it is essential to recognise the functions of biodiversity and ecosystems for selecting representative systems of MPAs in the natural environment (IMCRA Technical Group 1997). In addition to these benefits, it has

increasingly been acknowledged that MPAs support economic development such as tourism (Edyvane and Lockwood 2005).

Although a number of MPAs have been established in tropical waters, the number and area of MPAs in temperate southeastern States (i.e. South Australia, Victoria and Tasmania) tend to be small[3]. Although Tasmania has proclaimed seven marine reserves since 1991, many of them extend over a relatively small area and are still inadequate to conserve a representative system of marine biodiversity. In contrast, Victoria established one of the most advanced systems of MPAs in Australia by declaring 13 marine national parks and 11 marine sanctuaries in 2002 (VNPA 2004). It was the first time in Victoria that an entire suite of MPAs was created in a single jurisdiction (Rolland in Fyfe 2002). One of the key contributions to the success was support from the public for the introduction of MPAs (Miller in Allen 2002; Wescott 2005). Although it was seen as an historical achievement, Victoria also encountered a long and arduous public consultation process which involved much debate and political conservatism (Wescott 2005).

According to Wescott (2005: 33), there are three key points that contributed to Victoria's successful MPA establishment and which could have application to other jurisdictions, such as Tasmania. The following three initiatives have been adopted and expanded on contributed to during the establishment of MPAs:

- a strategic and tactical approach;
- a clear education and communication strategy; and
- an institutional framework for clear independent decision making.

A high level of community awareness and support for the system in Victoria has been developed by collaboration of government agencies, non-governmental organizations (NGOs) and community groups. As Dropkin (2000), Kelleher and Kenchington (1991) and Leaman (2004) argue, public understanding and support is required from key decision-makers such as politicians, economic and environmental professionals,

[3] The number and area of Australian MPAs are presented in Table 2.4 in Chapter 2.

industry sectors and the wider community. In order to encourage public participation in the process of developing MPAs, education has also played a critical role.

1.2 Marine Education and MPAs

As seen in Victoria, community support was critical for the establishment of MPAs and education was the most significant tool used to enhance public understanding. In this study, schools can be considered as formal education providers in which teacher-student interactions are a part of a curriculum framework. Community education is considered to be a more informal process of improving general understanding and awareness in the broader public. Even though each state government is involved, through formal education by schools, the Commonwealth Government and various NGOs also can be the providers and can be involved in marine education in both formal and informal ways.

At a national level, the Commonwealth Government has committed to develop a *National Marine Education Program* in the initiative entitled *Ocean Rescue 2000.* The Great Barrier Reef Marine Park Authority played a core role with the assistance of other agencies and institutions (Anon n.d.; Parvey 1997). At a more regional level, the National Oceans Office intended to develop an *Education Action Plan* within the framework of *South-east Regional Marine Plan* by reviewing current education programs to identify the regional needs for marine education (EA and Department of Agriculture, Fisheries and Forestry 2000).

With respect to NGOs, the Marine Education Society of Australasia (MESA) is a key national organization which has been playing important roles in promoting and supporting marine education. It recognises that marine education is still inadequately implemented in Australia. Therefore, it contributes to linking organizations, industries and educators in order to facilitate improved implementation of marine and coastal education for the common goal of conserving the marine environment. It also hosts the national event "Seaweek", organises workshops and conferences, and develops educational kits (MESA 2005).

Some of the most important providers of marine education at a state level are Marine

Discovery Centres (MDCs). Some States have established and supported MDCs offering marine education programs, including fieldwork. Programs offered at MDCs focus on school students from primary to tertiary level, but also provide opportunities for learning about regional marine environments to the wider community (Sahertian 2002). For example, the MDC in Queenscliff, Victoria, provides marine programs based upon the Victorian school curriculum, as well as offering field and boat trips to marine parks and marine sanctuaries. Marine education programs have been used in MPAs for both formal and informal education (ECC 2001; MRSC 1996).

Nevertheless, each State has different marine education programs and the degree of commitment varies between jurisdictions. Victoria, in addition to the recently introduced MPA system, offers a number of marine education programs and activities. Moreover, marine rangers and marine planners within Parks Victoria contribute to public education by informing visitors about MPA related issues. In contrast, current programs and resource allocation for marine education and promotion of MPAs in Tasmania are still inadequate for managing existing MPAs and for raising public awareness of marine environments. For example, there has not been a single position created for an officer who would promote and manage MPAs within the Tasmanian Parks and Wildlife Service (Edyvane, pers. comm., 2005).

Therefore, there is a critical need to enhance the resources available for supporting MPAs, and also for Tasmania to learn from Victoria's experience in MPA planning and management. Particularly useful is an understanding of how MPAs were successfully established and how marine education and communication were promoted. These factors can contribute to further development of marine education programs and the establishment of establish a well-balanced representative MPA system in Tasmania.

1.3 Significance of the Study

Although Tasmanians are closely connected to the coast and sea, concern about the local marine environment is limited, and degradation of the marine environment continues. Education that can raise awareness, encourage responsible action and increase support for conserving the natural environment is an effective tool for reversing this degradation. Education can be provided within a school environment or at a wider community level.

Nevertheless, there has been little development of marine educational policies and programs in Tasmania.

With regard to MPAs, public involvement and support are critical for their establishment and management. However, the majority of MPAs have been declared mainly for scientific purposes, and the social dimensions, which include educational use, have not adequately been taken into consideration for their selection. Although many argue for community engagement in MPAs, little research has been undertaken to identify appropriate approaches to strengthen community awareness in MPAs. In fact, there has been no research undertaken to review Tasmanian school and community marine education policies and programs, which can promote the social value of MPAs. Within this paradigm, there is an urgent need to analyse current marine education policy and programs, and to develop criteria for identifying and evaluating existing and potential MPAs for educational purposes in Tasmania, and to compare them with those of Victoria so as to seek recommendations for the future development of marine education and MPAs in Tasmania.

1.4 Research Aims and Objectives

This research is designed to fulfil the following two aims:

- to identify educational policies, strategies and opportunities to promote MPAs in Victoria and Tasmania; and
- to assess factors that could enhance MPAs for education purposes in Tasmania.

In order to fulfil these aims, several research objectives are addressed:

- to outline the development of MPAs at national and state levels;
- to review and analyse school and community based marine education programs in Victoria and Tasmania;
- to conduct a questionnaire and assess the degree of commitment of government and non-governmental organisations to marine education and MPAs; and

- to identify MPAs that could be used to support marine education for schools and the community.

1.5 Methodology, Limitations and Data Analysis

Qualitative research methods are employed in this study. This type of research has been applied to all the major studies related to critical social science approaches (Neuman 2004; Winchester 2000). Social research is conducted by investigating social processes, collecting empirical data, and interpreting them in social context or specific setting (Dowling 2000; Neuman 2004).

Two major research techniques have been employed in this study: a literature review and a research questionnaire. A literature review was conducted as the first step in the data collection process. Major data for this study were collected from reviewing literature that was mostly relevant to MPAs, marine education, and environmental education in Australia, Victoria and Tasmania. The literature included academic papers and reports, books, strategic plans, journal articles, booklets, guides for marine education, and government policies and legislation.

The literature review played an essential role in this study. It assisted the research by:

- narrowing down a broad topic to an appropriate scale;
- providing opportunities to learn key ideas and issues from the studies of others; and
- presenting useful sources for providing new concepts (Neuman 1994).

Moreover, the literature review facilitated identification of key informants for the research questionnaire in the areas of MPAs and marine education. Searches for related literature were conducted at the libraries of the University of Tasmania, the State Library of Tasmania, the Tasmanian Department of Primary Industries, Water and Environment (DPIWE), the Department of Education, and Hobart College. Many technical reports on MPAs, and information on marine environmental education programs were collected from official web sites such as Environment Australia, Parks Victoria, Marine Discovery Centres, and other relevant NGOs.

The questionnaire is used as a tool in social research and widely applied in investigation, field study and other data-collection activities (Babbie 2002). When designing a questionnaire, it is important "to develop a query that every potential respondent will interpret in the same way, be able to respond to accurately, and be willing to answer" (Dillman 2000: 32). A researcher should also avoid complexity. This may be caused by using jargon, abbreviations, emotional language, or double-barrelled questions, which consist of two or more questions joined together. It is also necessary to minimise the probability of bias as it may lead respondents in certain directions. Furthermore, a researcher should keep viewpoints of respondents in mind as essential for structuring questions (Babbie 2002; Bailey 1982; Neuman 2004).

A questionnaire with 11 open-ended questions was designed to obtain insights of key informants in this study. According to Bailey (1982) and Patton (2002), the benefits of open-ended questions include:

- encouraging respondents to answer adequately;
- giving respondents a way of answering without predetermining questionnaire categories; and
- allowing respondents more chance for flexible and creative answers.

Questions were outlined in two parts, the first containing 10 questions that were entitled "General Questions". These questions were based on policies and strategies, current programs, resources and funding, and major impediments relevant to both MPAs and marine education. In the second part, participants were asked to provide details of any marine education programs that they currently offered.

Traditionally, questionnaires are distributed with a letter of explanation by mail, and participants use the enclosed stamped envelope to return them to the researcher (Babbie 2002; Neuman 2004). However, in this study the questionnaire was distributed by email. All participants involved used email to return their questionnaires. The benefit of utilising email was to save time, simplify logistics and reduce the cost of the research. The informants were not selected as a representative sample of all stakeholders. Rather,

they were selected as proponents of marine education and experts in the related field. The questionnaire was distributed in early August 2005 to 50 participants who were identified by primary literature review. Thirteen, four and two responses to the questionnaire were returned from Tasmania, Victoria and other jurisdictions, respectively. Therefore, total response rate was about 38 per cent.

Answers from open-ended questionnaires require a qualitative approach to data analysis. The analysis involved examining particular sets of connections, patterns, frequencies, magnitudes, structures, consequences and causes within the collected data (Babbie 2002). Therefore, a thematic style of data interpretation was carried out for grouping important and similar statements.

Yet several limitations can be pointed out. In this research, targeted informants are government agencies and NGOs. Schools have been excluded because it was difficult to identify appropriate schools within the given period of the research. There are not many providers of marine education (excluding schools) in government and non-government sectors in Victoria and Tasmania, even though they work within marine related areas, some have provided educational programs but not all are currently provided marine education. Therefore, limited marine education is provided especially in Tasmania and currently the marine education policy and strategies have not developed and adopted for different target groups such as nearby coastal residents, general community, various sectors within the commercial fishing industry, recreational fishers and different age groups. Thus recipients of marine education in this research are defined mainly as school students who receive formal education and members of the wider community who can participate informal education including awareness raising activities.

In addition, this research particularly focused on MPAs in Tasmania and Victoria and their marine education. There was a limited availability of literature regarding the topic, therefore, some unpublished literature has been cited in this study, especially for Chapter 2.

1.6 Ensuring Rigour, Validity and Ethics Approval

Bradshaw and Stratford (2000: 37) argue that "careful design and rigour are crucial to

the dependability of any research" and they should "be central concerns for qualitative researchers". Ensuring rigorous qualitative research develops trustworthiness of the work (Baxter and Eyles 1999). Therefore, it is necessary to consider the research design, which must be performed from the earliest stage and throughout the entire research process (Leaman 2004) to assure validity. With the purpose of ensuring rigour and in order to reduce the bias of the research, certain approaches have been undertaken in this study including periodic meetings with supervisors to discuss the procedure of the research from an early stage, and the adoption of triangulation. The triangulation is used in research work by analogy when the researcher uses more than one research method or type of data to answer their research questions or test their hypotheses (Evans and Gruba 2002). The methods are also used for multiple investigative approaches and are effective for minimising the potential for bias and errors (Creswell 1994; Finn *et al.* 2000) during the process of the literature review and other data collection from key informants. In this research, the literature review, questionnaire and discussion with supervisors were the main components of the triangulation methods.

Qualitative methods in social research can interrupt people's privacy and may even cause harm to participants (Neuman 2004). According to O'Connel *et al.* (in Dowling 2000: 25), ethics is broadly defined as concerning "the conduct of researchers and their responsibilities and obligations to those involved in the research, including sponsors, the general public and most importantly, the subjects of the research". Babbie (2002: 56) states that "anyone involved in social scientific research, then, needs to be aware of the general agreements shared by researchers about what is proper and improper in the conduct of scientific inquiry".

Postgraduate research conducted at the University of Tasmania is required to have formal approval from the ethics committee before commencement. It is necessary to ensure the research does do not involve any harm or risk to the participants. This study received approval from the Tasmania Social Science Human Research Committee on 25 July 2005. When questionnaires were distributed, a research information sheet was provided to the key informants. The information sheet provided relevant details of this study and informed them that response to the questionnaire was voluntary. Although key informants were asked by the information sheet that whether they wished to remain

anonymous or consent to being named in the research, no informants objected to being named.

1.7 Chapter Outline

This thesis is composed of seven chapters.

Chapter 2 provides background information on MPAs at a national level with specific detail on the States of Victoria and Tasmania. In addition to general MPA background, marine education and community engagement regarding MPAs are discussed. The Victorian analysis highlights the lessons learnt from the MPA development process in that state, which would inform the Tasmanian case. These lessons provide ideas about recent MPA development and identify the significance of public understanding and support.

Chapter 3 addresses the evolution, principles and goals of marine education and its challenges, discussed in an international and national context. This provides a context for marine education, particularly the focus on school and community involvement. Furthermore, this chapter discusses how marine education is integrated into school curricula, and the role of community marine education.

Chapter 4 outlines the results of the questionnaire from participants representing government organizations and agencies in both States. Existing marine education strategies, and resources allocated to promote marine education programs especially relevant to MPAs are presented and analysed. This chapter also examines major impediments to conducting marine education programs and the current use of MPAs for educational purposes. In addition to the questionnaire results, there is an analysis of existing marine education programs, identified from the literature review.

Chapter 5 presents the responses collected from the questionnaire provided by key informants of NGOs and community groups in both states. The current state of marine education and how MPAs are used for educational purposes are analysed. This chapter also lists available marine education programs, which are identified by the survey and the literature review.

Chapter 6 presents a critical analysis and comparison of questionnaire results from two States and available marine education programs. This chapter also identifies significant lessons learnt from Victoria and discusses their possible application in Tasmania. Moreover, the role of marine education in promoting the establishment of MPAs is analysed.

Chapter 7 summarises the findings of this research and concludes with key recommendations for the possible improvement of marine education, which includes development of MPAs for educational purposes in Tasmania. The chapter ends by addressing factors that could enhance MPAs for educational use and potential MPA sites for educational use in Tasmania.

Chapter 2

Marine Protected Areas in Australia, Victoria and Tasmania

2.1 Overview

In this chapter, Australia's MPA policies, strategies and development process are examined, particularly from an educational perspective. Following this, the history of MPA development, the legislative framework, community involvement, and challenges relevant to MPAs in Victoria and Tasmania are investigated. Victoria's experience of establishing a network of 24 MPAs in 2002 is particularly useful as a potential model for the future development of MPAs in Tasmania.

2.2 Australia's Marine Protected Areas

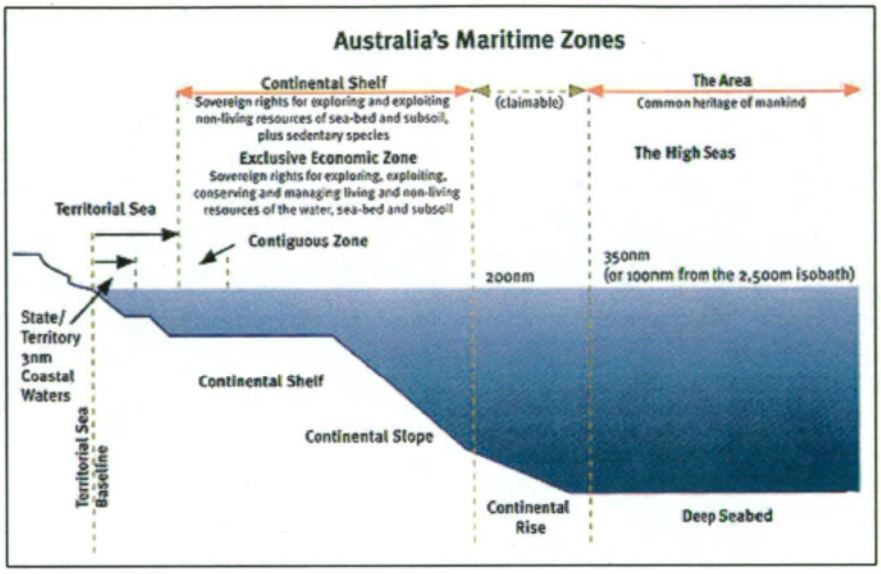
Australia has been internationally acknowledged as one of leading countries in marine conservation and the establishment of MPAs (Kriwoken 1996; Wescott 2005). All Commonwealth and state/territory governments have recognised the importance of a comprehensive, adequate and representative system of MPAs by endorsing frameworks such as the *National Strategy for the Conservation of Australia's Biological Diversity 1992* and the *Commonwealth Coastal Policy* (Kriwoken 1996). International coverage of MPAs is less than one per cent of the marine environment (Pomeroy *et al.* 2004). In contrast, five per cent of Australian waters are MPAs, and Australia is regarded as a leader in MPA designations. An example of this was the introduction of a 33 per cent "no-take" zone[4] in the Great Barrier Reef Marine Park (GBRMP) in 2004 which was regarded as a remarkable achievement. Wescott (2005: 8) points out "these positive achievements may be related to the emphasis in Australian literature on how to develop a MPA system, in contrast to the global literature which tends to concentrate on post declaration planning and management".

Marine and coastal environments in Australia are managed by the Commonwealth and state/territory governments. Commonwealth jurisdiction extends from three nautical miles to the Exclusive Economic Zone (200 nautical miles) and the state/territory

[4] All forms of extraction of living natural resources (eg. fishing) and most often gas, oil and minerals are prohibited (Wescott 2005).

governments operate a maritime zone from the low-water mark to three nautical miles (Figure 2.1) (Environment Australia [EA] 1997; Department of the Environment and Heritage 2002; Zann 2003). MPAs which overlap both Commonwealth and state/territory jurisdictions are cooperatively managed (Zann 2003).

Figure 2.1 Australia's Maritime Zone (Australia 2002a)



The definition of a MPA, which the Australian and New Zealand Environment and Conservation Council (ANZECC) has adopted from the World Conservation Union (IUCN) is as follows: "an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and managed through legal or other effective means" (ANZECC 1999: 15; Department of the Environment and Heritage [DEH] 2004). Established MPAs in Australia range from small, highly protected reserves, mainly for conservation and scientific research purposes to large, multiple-use reserves in which sustainable human activities are allowed (DPIWE 2000). Selected Commonwealth legislation and policy such as the *Environment Protection and Biodiversity Conservation Act 1999* and *Australia's Oceans Policy 1998* have been developed to fulfil Australia's responsibility in marine conservation (Cresswell and Thomas 1997; Edyvane 2005).

In 1991, *Ocean Rescue 2000* was launched by the Commonwealth Government as a 10 year program for marine and coastal environmental conservation. The major goal of the

program was to ensure conservation and promote sustainable use of the marine environment Australia. Six key components were identified in the program and the Commonwealth Government developed the following initiatives in cooperation with state/territory governments:

- Australian Marine Conservation Plan;
- State of the Marine Environment Report;
- National Representative System of Marine Protected Areas (NRSMPA);
- National Marine Education Program;
- Marine and Coastal Community Network; and
- National Marine Information System (DPIWE 2000; Kriwoken 1996).

The establishment of the NRSMPA helps Australia to meet its international obligations and contributes to the development of a global representative system of MPAs that has been supported by IUCN through its World Commission on Protected Areas (IMCRA Technical Group 1997). The NRSMPA has a primary goal to develop a Comprehensive, Adequate and Representative (CAR) system of MPAs to promote and sustain the viable marine ecological systems, and to provide appropriate protection for Australia's biodiversity at all levels (ANZECC 1999; DEH 2003). One of the essential elements of the initiative includes promoting public education by utilizing MPAs (DPIWE 2000). The key steps for developing the NRSMPA are as follows:

Step 1 Gather baseline data, including ecosystem mapping.

Step 2 Identify a list of candidate areas within Interim Marine and Coastal Regionalisation in Australia.

Step 3 Identify threatening processes.

Step 4 Identify gaps in the representation of ecosystem in existing MPAs within each IMCRA region.

Step 5 Develop national and regional priorities.

Step 6 Develop additional criteria for identification and selection of MPAs if required.

Step 7 Select sites for MPAs from the candidate areas, using selection criteria and any other additional criteria developed in Step 6.

Step 8 Assess the feasibility of potential MPAs and negotiate new protected areas.

Step 9 Establish MPAs and initiate management including evaluation and review. (ANZECC 1999: 51)

Steps 2 and 7 refer to the following identification and selection criteria:

(identification criteria)

- representativeness
- comprehensiveness
- ecological importance
- international or national importance
- uniqueness
- productivity
- vulnerability
- biogeographic importance
- naturalness

(ANZECC 1999: 54)

(selection criteria)

- economic interest
- indigenous interest
- social interest
- scientific interest
- practicality/feasibility
- vulnerability assessment
- replication

(ANZECC 1999: 55)

"Social interest" and "practicality/feasibility" include an educational component. As a guide to the selection process, there are criteria which candidate sites are expected to meet. These include "existing or potential value to the local, national or international communities because of its heritage, cultural, traditional aesthetic, educational, recreational or economic values" (ANZECC 1999: 55). In addition, the area should "have access for recreation, tourism and education" (ANZECC 1999: 55). However, no specific details or factors are provided to facilitate the process of selection. If details were given, they could facilitate the identification of suitable candidate sites. Table 2.1 presents current distribution of MPAs in Australia by jurisdiction, the number of MPAs, the area in hectares, and national and state/territory coverage by the percentage.

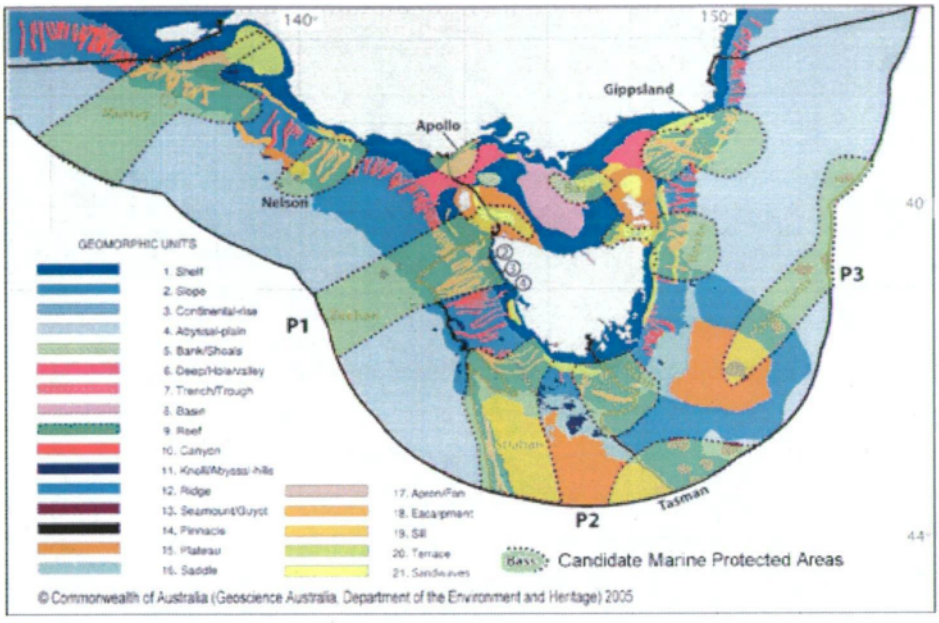
Table 2.1 National Representative System of Marine Protected Areas by State/Territory and Commonwealth Jurisdiction (Source: Edyvane 2005)

States/Territory	Number of MPAs	Marine Protected Area (hectare)	% State/Territory Waters	% National Total of MPAs
Queensland	82	5,421,117	51.0	7.8
New South Wales	17	165,570	19.2	0.2
Western Australia	9	1,475,763	12.8	2.1
Tasmania	7	128,888	5.5	0.2
Tasmania (excluding Macquarie Island)	6	47,420	2.1	0.1
South Australia	20	318,719	5.3	0.5
Victoria	24	53,776	5.2	0.1
Northern Territory	3	223,946	3.0	0.3
Subtotal	**162**	**7,787,783**		**11.2**
Commonwealth				
Great Barrier Reef Marine Park	1	34,416,900		49.6
Other MPAs (excluding GBRMP)	13	27,218,080		39.2
Subtotal	**14**	**61,634,980**		**88.8**
IUCN Management Categories Ia & Ib	14	15,192,890		21.9
Total MPAs in Australia	**176**	**69,422,763**		

In 1995, the Commonwealth Government launched a project to establish *Interim Marine and Coastal Regionalisation for Australia* (IMCRA). This was an important step towards the establishment of the NRSMPA by providing a national and a regional framework based on marine and coastal ecological bioregions (ANZECC 1998; ANZECC 1999). The major aim of the project was to develop "a single, ecosystem-level regionalisation of Australia's coastal and marine environments" (IMCRA Technical Group 1997: 5). The project was managed by a Biodiversity Group at EA with the assistance of responsible state/territory agencies. Edyvane and Lockwood (2005) argue that MPAs in both Commonwealth and state/territory waters should be comprised of representative marine ecosystems from each IMCRA region.

In addition to the existing MPAs, the Commonwealth Government released a proposal for establishing relatively large MPAs (Figure 2.2) in December 2005. The proposed sites cover 171,000 km^2 (2.5 times the size of Tasmania's land area) of Commonwealth waters in the southeastern region (Tasmania, Victoria, eastern South Australia and southern New South Wales) where undersea mountains and canyon systems occur. This area has been heavily fished (AMCS 2005) and the proposal includes a $220 million buy out package for the fishing industry. Within the proposed MPAs, 40 per cent are to be highly protected and commercial fishing is to be prohibited in another 40 per cent of the area (DEH 2005b). However, according to Smyth (in MCCN 2006a: n.p), this draft proposal fails to provide strict protection or the "right balance between protection and use". With respect to the 2003 World Parks Congress recommendations, the draft should allocate minimum 30 per cent of the region as 'no-take', but currently only 14 per cent of the region is allocated as 'no-take'. Moreover, the proposal does not prohibit oil and gas exploration and there is a concern that mining could continue in a large area of future MPAs (Smyth in MCCN 2006a). The Commonwealth Government sets a three month public consultation period and welcomes comments from the State governments, industries, NGOs and the public. After the Commonwealth Government has finished consultations, the MPAs will be declared under the EPBC Act later in 2006.

Figure 2.2 Proposed Commonwealth Government's Marine Protected Areas in the Southeast Australia (AMCS 2005)



MPAs can be established and managed for various purposes. In 1978, the IUCN management categories (from Category I/strict protection to Category VI/sustainable use) were introduced to provide international standards to reduce confusion and to facilitate mutual communication on protected areas in each country (IUCN-WCPA 1994). These categories were intended for those involved in managing protected areas. They were designed to "provide a common language by which managers, planners, researchers, politicians and citizens group in all countries can exchange information and views" (IUCN-WCPA 1994: n.p.). The essential principle is that categories should be defined by the objectives of management not by the title of the area.

Table 2.2 presents the IUCN management categories and their management objectives. Except for Categories Ia and Ib, educational use of protected areas, including MPAs, has been recognised as a secondary management objective. MPAs managed as categories II to VI, are available for educational purposes. As presented in Table 2.1, about 20 per cent of MPAs (by area) in Australia have been allocated Category Ia and Ib. Therefore, considering both Tables 2.1 and 2.2, about 80 per cent of MPAs (by area) have the potential to include educational purposes.

Table 2.2 Management Objectives and IUCN Protected Area Management Categories (Source: IUCN-WCPA 1994)

Management Objectives[5]	Ia	Ib	II	III	IV	V	VI
Scientific research	1	3	2	2	2	2	3
Wilderness protection	2	1	2	3	3		2
Preservation of species and genetic diversity	1	2	1	1	1	2	1
Maintenance of environmental services	2	1	1	/	1	2	1
Protection of specific natural/cultural features	/	/	2	1	3	1	3
Tourism and recreation	/	2	1	1	3	1	3
Education	/	/	**2**	**2**	**2**	**2**	**3**
Sustainable use of resources from natural ecosystem	/	3	3	/	2	2	1
Maintenance of cultural/traditional attributes	/	/	/	/	/	1	2

(1 Primary objective, 2 Secondary objective, 3 Potentially applicable objective, / Not applicable)

Although the use of MPAs for educational purposes has been recognised in the IUCN management objectives, limited use has been promoted throughout Australia. The management of some MPAs, especially in tropical waters (such as the GBRMP in Queensland), have acknowledged the importance of education for marine conservation and promote marine education to both school students and the wider public. In temperate waters, there is much less use of MPAs for the purposes of marine education (Edyvane and Lockwood 2005).

Education is one of the most significant tools to increase community understanding of MPAs. The importance of community engagement and support for all levels of the establishment and management of MPAs has been widely recognised (EA 1997; Zann 2003). Kelleher and Kenchington (1991: 21) state that a well-organised education and community participation program can develop "political and public enthusiasm for the MPA" and its future goals. It is important to generate public ownership that encourages

[5] Ia Strict protection (i.e. Strict nature reserve)
Ib Strict protection (i.e. Wilderness area)
II Ecosystem conservation and recreation (i.e. National Park)
III Conservation of natural features (i.e. Natural monument)
IV Conservation through active management (i.e. Habitat/species management area)
V Landscape/seascape conservation and recreation (i.e. Protected landscape/seascape)
VI Sustainable use of natural ecosystems (i.e. Managed resource protected area)

commitment to declare and manage MPAs. Therefore, governments at both national and state/territory levels, should involve community education through the legislation and policy plans (Kelleher and Kenchington 1991; Smyth *et al.* 2003).

As previously noted, Australia is one of the leading countries in marine conservation. However, even with these achievements, there is also much room for improvement. In 2002 at the World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa, there was a call to designate 10 per cent of world's oceans with MPAs. From this perspective, even though five per cent of MPA coverage in Australia is internationally significant, Australia needs further commitment. At a national level, Kriwoken and Haward (1991) and Smyth *et al.* (2003) argue that one of the critical weaknesses of the MPA establishment system is the complexity of legislation and an overlap of responsibilities across legislation and implementing government agencies. For instance, it took nine years to develop and release the Strategic Plan of Action for the NRSMPA which was launched in 1990, by the Commonwealth Government (Smyth *et al.* 2003). In addition the formal protection of the marine environment by declaring MPAs is a comparatively recent development and there has still not been much improvement in marine resource management (Edyvane and Lockwood 2005). Kelleher *et al.* (1995) and Zann (1995) have identified a lack of comprehensive and long-term marine policy, and insufficient representation and gaps in coverage of MPAs in IMCRA regions, especially in temperate waters. Therefore, there is a necessity to enhance Australia's marine policy and to develop a systematic approach and coordination to establish the NRSMPA (Kelleher *et al.* 1995).

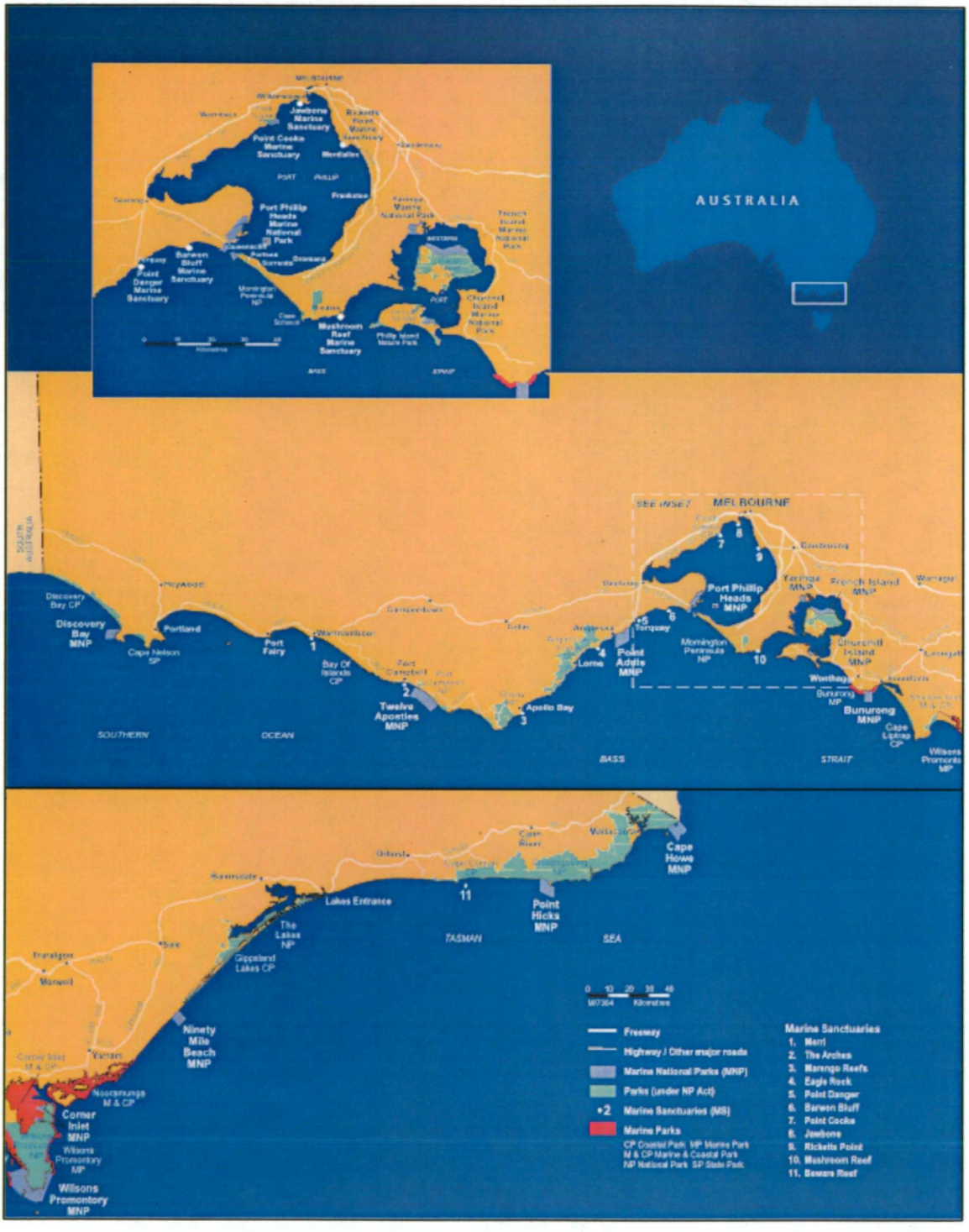
2.3 Marine Protected Areas in Victoria

To fulfill Victoria's commitment on the NRSMPA and conserve the local marine environment, in November 2002, Victoria proclaimed a fully protected MPA network under the *National Parks Act 1975*, comprising of 13 marine national parks and 11 marine sanctuaries along the 2000 km coastline (Parks Victoria 2003b). It was an historical achievement to establish an entire MPA system in a single jurisdiction and the MPAs covered 5.3 per cent (529km^2) of State waters (Fyfe in Allen 2002; VNPA 2004). As well as the commitment, The aim of establishing such a MPA network was to protect distinctive temperate marine ecosystems in Victoria. It supports one of the world's

highest biodiversity, including kelp forests, rocky reefs, and sponge beds, and a remarkable rate of endemic species (90-95 per cent) that occur only in southern temperate waters.

More importantly, all of the MPAs are highly protected or "no-take" reserves where all natural resource extraction and exploitation activities such as mining, fishing, dredging and waste disposal are prohibited by legislation (VNPA 2004). These MPAs are managed by Parks Victoria with the assistance of Fisheries Officers, whose numbers were increased by the State Government at the time of the proclamation of the MPAs (Wescott 2004; Blayney and Wescott 2004; Parks Victoria 2003b). According to the ECC (2001), these marine national parks and marine sanctuaries are designated as IUCN management categories Ia, Ib and II, which have a high level of protection. Figure 2.3 shows Victoria's marine national parks and marine sanctuaries and Appendix 5 presents the name, area and significance of the marine environment and other features of the MPA system.

Figure 2.3 Maps of Marine National Parks and Marine Sanctuaries in Victoria
(Parks Victoria 2003b)



2.3.1 The Processes for Declaration

Internationally and nationally, the profile of MPAs in Victoria has been substantially increased when it hosted the First International Marine Protected Area Congress in Geelong in October 2005 with over 800 delegates attending from throughout the world. However, prior to the declaration in 2002, there were 11 MPAs covering 4.5 per cent of Victoria's marine and coastal waters with less than 0.05 per cent (4.99km^2) highly protected, across five MPAs (ECC 2001; Garrett in Allen 2002; Traill and Porter in Wescott 2005). It was a long and arduous process to develop the 24 highly protected MPAs. In fact, it took 20 years, a very slow process (Wescott 2005).

The first MPA, the Harold Holt Marine Reserve at the head of Port Phillip Bay, was proclaimed in 1978. In 1982, the then newly appointed Government pledged to promote MPAs in Victoria. The Land Conservation Council (LCC) conducted MPA research and made recommendations for appropriate sites and procedures for establishing a comprehensive, adequate and representative system (CAR system) of MPAs (ECC [Environment Conservation Council[6]] 2001; Wescott 2005). Nevertheless, the release of the recommendations shocked and displeased the local community. A campaign to oppose the declaration resulted in a long delay. Wescott (2005) argues that the Government could have minimized the otherwise unforeseeable delay and oppositions by guiding the LCC to undertake marine and coastal research not only concentrating on MPAs but also on other relevant marine issues in the region.

There was continuous resistance to any MPA from the fisheries sector, and the general public. A lack of understanding of the marine environment also led to the failure to generate support for implementing LCC's recommendations or to accelerate the government's commitment. In 1991, the LCC undertook land-use planning and released a draft of the final report in 1996. Yet, in the process of concluding the recommendations, the LCC was suddenly disbanded by the government and the newly established ECC took charge of developing a marine parks system. In a relatively short time, the ECC submitted a final recommendation report in August 2000, after completing six public consultations from the LCC period (Davis *et al.* 2003; Wescott

[6] Currently replaced by the Victorian Environmental Assessment Council (VEAC) appointed under the Victorian Environmental Assessment Council Act 2001 (VEAC 2006).

2005).

Due to considerable lobbying by stakeholder groups, the government modified its recommendations without any scientific justification and removed one marine national park and one marine sanctuary. Although the government increased temporary financial support for fisheries, they could not find sufficient support from the opposition parties and the Bill was withdrawn in mid 2001. A year later, after modification and compensation was added, a second version of the Bill was introduced. The final stage of establishing MPAs in Victoria was a very political process. A critical element for the success of the campaign was the support from major political parties; and in April 2002, Labor and Liberal ex-Premiers voiced their support in *The Age* newspaper. After a short period, in June 2002, the Bill was passed and 24 MPAs were established in November 2002 (Baker and Dubecki in Allen 2001; Davis *et al.* 2003; Wescott 2005). Initially it was considered that the campaign would be complete in four years, however, it had taken 20 years to achieve.

Although fully protected MPAs were introduced, because of several modifications, the marine park system was reduced from 6.2 per cent to 5.3 per cent with a loss about 90 km^2 of state waters (VNPA 2004). Wescott (2005: 20) argues that, victory of the opposition group in reducing the size of MPAs "is likely to be a pyrrhic one", as over-fishing and pollution has limited the catch.

There is an urgency to introduce a highly protected MPA system in Victoria. Fishing is one of the major industries, and abalone and rock lobster are the main contributors to income generation rather than fin-fish. Since abalone and rock lobster are largely restricted in their movement, introducing proper MPA boundaries is of the utmost importance to minimise the impact of over exploitation (Wescott 2005). Therefore, fully protected MPAs would contribute to not only biodiversity conservation but also to fisheries management.

2.3.2 MPAs from the Community Perspective

Generally public understanding and awareness of conservation of the marine environment is relatively low (Rodrigue 2004). Disinterest hinders people from active

participation in the development of MPAs and their sustainable management (DEH 2005a; CBD 2004). Even though Victoria succeeded in creating a highly protected MPA system in 2002, it is still confronted with issues of how to improve public awareness and obtain support (Smyth *et al.* 2003). Phillips (in Davis *et al.* 2003) states "the majority of the public do not have a strong view in either direction about MPAs". In addition to the public, recreational organizations such as tourist operators and dive groups did not show particular interest or support. Although they turned into mild supporters at the end of the campaign, they were more likely to be seen as neutral groups or even disinterested in establishing MPAs (Wescott 2005).

However, Rodrigue (2004) and Wescott (2005) point out that public attachment to the Victorian beach and coast is high and people have developed their own coastal culture. Moreover, when Victoria experienced controversial debate on developing terrestrial protected areas in 1960s and 1970s, the public expressed huge support for parks and created the present park system. These experiences suggest that there is a potential for the public to provide strong support for marine conservation and MPAs.

The most critical element in overcoming the public's low interest and a lack of support, and leading the campaign for successful establishment of a highly protected marine park system, was the existence of key NGOs. Their long-term dedication to MPAs and sufficient funding for them to continue their campaign were crucial. The Victorian National Parks Association (VNPA) played a major role from the beginning of the campaign, which started in late 1970s, and the Marine and Coastal Community Network (MCCN) has also been involved in the campaign since 1993. They supported "no-take" MPAs from the beginning and never yielded or changed their commitment even when sectoral or political opposition was strong (Allen in Davis *et al.* 2003; Wescott 2005). Wescott (2005: 14) maintains "the VNPA's support for MPAs never wavered over 25 years". Although other national NGOs such as the Australian Conservation Foundation and the Australian Marine Conservation Society also supported the campaign in 1990s, there was a lack of consistency due to personnel changes.

In addition to NGO commitment, the campaign for MPAs had support from key officials in government departments (Wescott 2005). The State Government had

conducted extensive stakeholder consultations over a 10 year period (Rodrigue 2004). Furthermore, in 2001, 160 of America's leading scientists issued a manifesto supporting development of highly protected MPAs. Shortly after, 115 of Australia's major marine scientists endorsed a statement, which urged the importance of highly protected MPAs for biodiversity conservation, and this assisted in the establishment of an MPA network in Victoria (Leonard 2001; Smyth *et al.* 2003).

In addition to support from various organizations and individuals, the presence of the ECC contributed to the overall success because it was considered an independent and trustworthy body. It played a major role in undertaking public consultation and assessment of controversial assertions from proponents and opponents of a marine parks system. Another significant contribution was from the Victorian Coastal Council, which performed an active role to promote a CAR system. It arranged the "MPA breakfast" for stakeholders such as industry and unions, and for public affairs commentators who have a strong influence on their decision-making process. It was held in the Melbourne Town Hall and during the event, films were shown and experts sat at each table to facilitate understanding of the subject. Although many of the participants had no special knowledge of MPAs or of Victoria's marine environment, this event provided information and raised their awareness of the issues (Wescott 2005). Wescott (2005) also argues that the concentration of a large population in Melbourne and Geelong facilitated the campaign in terms of organising activities and meetings.

2.3.3 The Challenges of MPAs in Victoria

The proclamation of the marine park system is not the end of the challenge to promote a sustainable MPA system for Victoria. According to the VNPA (2004) and Allen (in Davis *et al.* 2003), some park boundaries had been modified without scientific reasons during the development process. The parks and sanctuary boundaries need to be expanded as mentioned in the proposal. Smyth *et al.* (2003) also maintain that based on international research, Victoria needs 20 per cent of state waters to be protected as MPAs for conservation of all marine bioregions.

Another challenge is further community capacity building to enhance their involvement in the process of MPAs and understanding of the marine environment. Surveys

conducted by Parks Victoria and the National Oceans Office identified the importance of community education and set community marine education as a priority for better marine conservation (EAand NOO 2002; Parks Victoria 2003a).

Both before and after the declaration, Parks Victoria introduced two advertising tools to promoting MPAs. Signage was put up near the MPAs, and television and cinemas were used to inform the public about the newly established marine park system. Media advertisements were used from August to December 2002 and signage was organised at each MPA site around the proclamation date (Blayney and Wescott 2004). In order to analyse the effectiveness of these methods on public awareness, Goyen and White (in Wescott 2004) conducted a survey in Queenscliff (close to a MPA) and Hastings (not close to a MPA). According to the survey result, 53 per cent of respondents noticed the establishment. However, about 70 per cent of respondents could not name one and did not recognise their nearest MPA. Regarding restrictions, less than 20 per cent could point out restrictions and a little over 20 per cent misunderstood that recreational fishing was still allowed. Another interview survey conducted by Blayney (Blayney and Wescott 2004) indicates that only 23 per cent of people who were interviewed inside of a MPA recognised they were in an MPA, and 79 per cent had not seen the television and cinema advertising.

According to Alcock and Kenchington (in Blayney and Wescott 2004: 126), "assuring compliance with regulations is achieved in two ways: enforcement and education". It has been shown that "education works effectively at increasing compliance with regulations in a MPA". In addition, a study in the GBRMP by Alder (in Blayney and Wescott 2004: 126) found that "education was more cost effective than enforcement". The Victorian government promoted their new MPAs by media before and after the establishment, however, it had limited effectiveness due to it being over a short period. Therefore, Blayney and Wescott (2004) argue that community capacity building needs a long-term commitment and this can be achieved by less expensive approaches such as education.

The study of Goyen and White (in Blayney and Wescott 2004) also indicates that 78 per cent of users wanted more knowledge and information on MPAs and 96 per cent were

willing to enhance their awareness. The public, especially people who live close to the coast, desire to receive more marine educational opportunities was also found in a survey which was conducted in Australia's southeastern region (not only in Victoria) by the National Oceans Office in 2001 (NOO 2002). Parks Victoria recognises the need and made a commitment to build the public's capacity on marine issues. In its MPA Strategy entitled *Victoria's System of Marine National Parks and Marine Sanctuaries: Management Strategy 2003-2010,* the development of a management plan was to be completed within a certain timeframe. As well as the management plan, a *Marine Education Plan* will be introduced into operational planning and to promote public marine education in Victoria (Parks Victoria 2003b).

2.3.4 Lessons Learnt from Victoria

By examining Victoria's experience in the long process of establishing a fully protected marine parks system, clear lessons that can be applicable to other jurisdictions, particularly Tasmania. Wescott (2005: 33) states three key elements as critical lessons:

- a strategic and tactical approach;
- a clear education and communications strategy; and
- an institutional framework for clear independent decision making.

The first key lesson, "a strategic and tactical approach" is adopted as a critical approach in the VNPA and MCCN campaign. The VNPA has consistently insisted on establishing an entire suite of highly protected marine parks at once, and they never changed their stance over 25 years. When they failed or faced difficulties during the campaign, they analysed the causes and they reorganised and restarted the campaign immediately. The presence of such persistent organisations was extraordinarily important for Victoria. The VNPA and MCCN persisted to establish a network of MPAs because they acknowledged weaknesses which are caused by developing MPAs one by one. For instance, it is difficult to receive state-wide support to a MPA which would be established in one particular area. In addition, for opposition groups, it is easier to unite and focus against one proposal. In contrast, support for a state-wide MPA declaration can be gathered from the entire state. For opponents of MPAs, it is comparatively difficult to organise opposition to a range of proposals. It is very important to

understand the nature of the target audience. There are two main groups to persuade: particularly sectoral groups, such as fisheries and more open-minded citizens. Wescott (2005: 29) suggests that all messages should focus on the open-minded public who are more likely to listen and consider issues. "Appearing generous and conciliatory (willing to compromise and discuss issues) will not only counteract the negativity of these opponents but will portray you in the general community's mind as reasonable and caring, even about your strident opponents". In addition to daily grass-roots activities, it was a very successful approach to invite internationally known marine experts to give talks to stakeholders and the public about marine issues and the importance of conservation since the experts do not have any local vested interests (Wescott 2005).

The second key lesson is "a clear education and communications strategy". It should be recognised that not all of the community members are experts on MPAs and the marine environment. The VNPA and MCCN approach was to promote the importance of protecting Victoria's marine environment in a simple and precise message. They used "national park" as a familiar terminology and it was easily accepted and understood by the public since it has been introduced for many terrestrial protected areas. They tried not to use other terminology, such as marine reserves. Besides using familiar terminology, the public message was to let people know more about the beauty and the uniqueness of Victoria's sea and coast, rather than arguing about scientific roles or benefits of MPAs. Therefore, to recognise and use a more easily understood approach to attract people's interest and to generate support for marine conservation was a key element for their MPA campaign (Smyth *et al.* 2003; Wescott 2005).

The third key lesson is "an institutional framework for clear independent decision making". It indicates the presence of the LCC/ECC. According to Wescott (2005) a number of the LCC/ECC's recommendations have been adopted and reflected in government policy and legislation. Furthermore, the public also trust processes which have been undertaken by the LCC/ECC and people believed it could bring a result.

The establishment of 13 marine national parks and 11 marine sanctuaries was a laborious process and there have been a number of difficulties to overcome. However, many similar difficulties are also seen in other jurisdictions. As a neighbouring state,

Tasmania can learn many lessons from Victoria that would assist in developing a MPA system. Especially important is how to overcome community constraints and enhance community involvement from the early stages of the process. Finally, the ECC (2001) maintains that within a few years after declaration, there has been an increase of understanding and compliance of MPAs especially around the region.

2.4 Marine Protected Areas in Tasmania

2.4.1 Marine Environmental Issues

Tasmania's territorial sea is one of the world's smallest bioregions but the 3,200 km coastline has some of the highest marine biodiversity including rocky reefs, sandy beaches, lagoons, sea cliffs and open coasts (DPIWE 2001; Edyvane 2002; Zann 1995). Yet, this distinctively high biodiversity is under threat and Tasmanian marine and coastal environments face a number of issues including:

- poor water quality in major estuaries from heavy metals from mining and refineries, and elevated nutrients from sewage, urban and agricultural run-off;
- coastal catchment development from agriculture, urban and industrial development;
- introductions of the toxic dinoflagellate (*Gymnodinium catenatum*), Japanese kelp (*Undaria pinnatifida*), the Northern Pacific seastar (*Asterias amurensis*) and the Pacific oyster (*Crassostrea gigas*);
- decline in fisheries (scallops, lobsters);
- lack of recreational gillnetting controls;
- effects of dredging and trawling on sea floor; and
- alteration of hydrological cycle of major estuaries (Zann 1995: n.p.).

As in Victoria, commercial fishing is one of the major industries in Tasmania. Edger *et al.* (1995: 47) argue that "the consequence of rock lobster, abalone, finfish, sea urchin or seaweed removal to other species in Tasmania are presently unknown, but are probably substantial given that these organisms all interact and that various studies indicated that the removal of key species can alter ecosystem function".

2.4.2 Development and Current Situation of MPAs

To prevent further deterioration and to aid recovery and protection of the marine environment, some MPAs have been established in Tasmania. However, despite the existence of legislation such as the *National Parks and Wildlife Act (1970)* and the *Fisheries Act (1959),* up until the beginning of the 1990s, limited progress had been made for developing MPAs (Kriwoken and Haward 1991; Zann 1995).

Before the first declaration of four marine reserves in 1991, there were 15 marine and estuarine protected areas in Tasmania. These MPAs included Recreational Fishing Areas, No-netting/Restricted Fishing Areas, and Shark Nursery Areas. However, they were not fully recognised as MPAs because they did not provide an adequate protection for marine habitats as recommended by IUCN and the Council of Nature Conservation Ministers (CONCOM[7]) (Kriwoken and Haward 1991; DPIWE 2000).

The first MPA was proposed in 1972 at Rocky Cape on the north coast. No progress has been made on that site and it still remains a standing proposal (Bell in Leaman 2004). In 1981 a *Joint Policy for the Establishment and Management of Marine Reserves in Tasmania* was published in order to develop MPAs. Immovable opposition from the fishery sector and political conservatism prevented the establishment of these from occurring (Kriwoken and Anutha 1993). During that period, Edgar conducted a number of surveys and assessed potential sites for MPAs around Tasmania but the government has not paid sufficient attention and little effort had been made to implement his recommendations (Edgar 1984; Leaman 2004).

In 1989, the Tasmanian Government established a Marine Reserve Working Group, which consisted of three governmental agencies (the Department of Environment and Planning, the Department of Parks, Wildlife and Heritage and the Department of Primary Industry - Sea Fisheries Division) to accelerate the development of MPAs. Although a draft of a marine reserve proposal in 1990 including four potential marine reserves sites, it failed to outline clear development process and management methods.

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[7] CONCOM classification was particularly developed in assisting with promoting NRSMPA (IMCRA Technical Group 1997).

(Kriwoken 1993). After a comprehensive public consultation process in several coastal regions, four marine reserves (Tinderbox and Ninepin Point in the D'Entrecasteaux Channel; Governor's Island off Bicheno; and Maria Island off the east coast) were proclaimed in 1991. There was little further progress regarding MPA development in Tasmania until 1997 (Leaman 2004).

In 1997, the Tasmanian Fishing Industry Council (TFIC) and the Tasmania Sea Fishermen's Association (TASFA) identified five areas to be assigned as "no-take" for fish propagation purposes. The *Marine Reserve Management Bill 1997* was introduced in Parliament in 1998 (Barrett and Wilcox in Stump 2002) and included "no-take" areas in each of the Tasmanian bioregions, identified in the IMCRA process. However, the Bill shocked the community and met strong opposition because of a lack of community consultation before the introduction. In addition to considerable resistance and a lobbying campaign, a state election in late 1998 suspended deliberation of the Bill (Baelde *et al.* in Stump 2002). As a result, the Bill was never passed.

In 1999, a newly elected Labor Government established the Marine and Marine Industries Council (MMIC) in order to create the *Tasmanian Marine Protected Areas Strategy*. Funding was provided by the *Ocean Rescue* program and the Strategy was to contribute to the Commonwealth initiative of the NRSMPA. After two years of assessment and public consultation, the strategy was published in 2001. The Resource Planning and Development Commission (RPDC) was endorsed by the MMIC based on the *Resource Planning and Development Commission Act 1997* as an appropriate body for conducting an investigation for potential sites and planning of MPAs in Tasmania. Similar to the LCC/ECC in Victoria, the RPDC provided a legislative and independent framework for public consultation, conducted investigation and could make recommendations for suitable sites (DPIWE 2000; Leaman 2004; RPDC 2003). After the establishment of the RPDC, it was asked to finalize the assessment process of Port Davey/Bathurst Harbour and the Kent Group that were identified as potential MPAs. In August 2003, the RPDC submitted a Final Recommendations Report on marine reserves at Port Davey/Bathurst Harbour and the Kent Group (RPDC 2003). Overcoming political impediments, these two MPAs were declared in February 2004 (Leaman 2004).

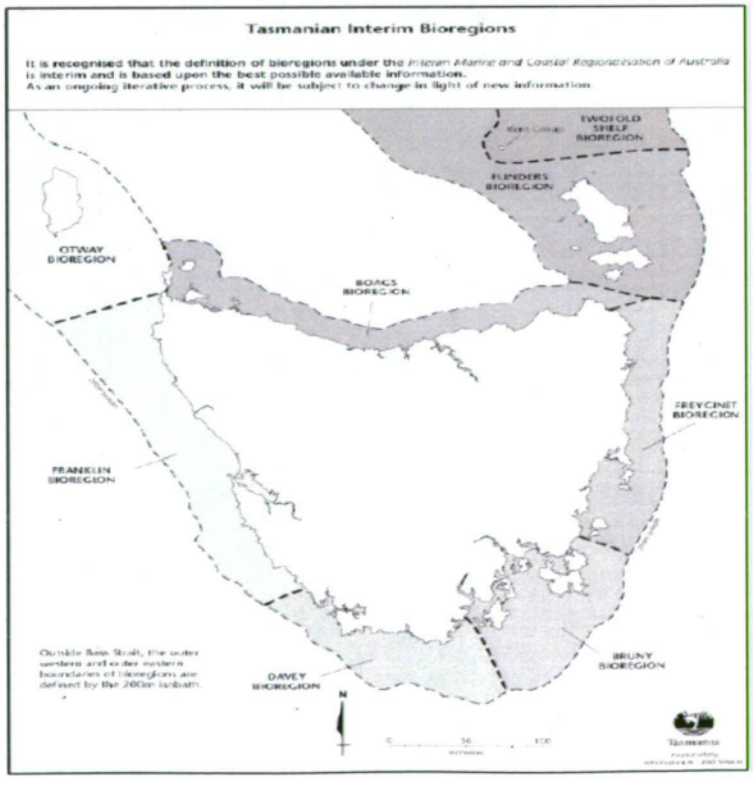
Table 2.3 summarises the designation, area, the IUCN management objectives, and restrictions of MPAs, which have been currently proclaimed in Tasmanian jurisdiction. Macquarie Island Marine Park, established in 2000, is managed jointly by the Commonwealth and Tasmanian State governments due to jurisdictional arrangement (DEH 2005a). Nevertheless, these declared seven MPAs (Figure 2.4) are located in only four bioregions (Figure 2.5). It shows a lack balance of representative system since no MPAs have been established in Franklin, Otway, Boags and Flinders Bioregions.

Table 2.3 Marine Reserves in Tasmania (Source: DPIWE 2000; MCCN 2001; Parks and Wildlife Service 2004) MR: Marine Reserve

Name	Declaration	Area (ha)	Management Objectives	IUCN Management Category	Restrictions
Tinderbox MR	1991	53	Education, recreation, research, biodiversity	IV	All no-take
Ninepin Point MR	1991	59	Biodiversity, unique environment, research	IV	All no-take
Governor Island MR	1991	60	Recreation, aesthetics, biodiversity	IV	All no-take
Maria Island MR	1991	1500	Representative habitats, biodiversity	II	Partly recreational fishing is allowed
Kent Group MR	2004	29,000	Representative habitats, biodiversity	II	Half of the area is no-take
Port Davey/Bathurst Harbour MR	2004	17,000	Unique environment and biodiversity	II	Half of the area is no-take
Subtotal		54,173	2.2 % State Waters		
Macquarie Island Marine Park (Commonwealth and State)	2000	74,715	Threatened species, biodiversity	Ia	All no-take
Total Area		128,888	5.5 % State Waters		

Figure 2.4 Declared Marine Protected Areas except Macquarie Island Marine Park, and Two Major Cities in Tasmania (PWS 2005b)

Figure 2.5 Bioregions of Tasmania as Defined under the Interim Marine and Coastal Regionalisation of Australia (DPIWE 2000)



2.4.3 The Challenges of MPAs in Tasmania

Seven MPAs in Tasmania cover 5.5 per cent of state waters. That is almost an equivalent percentage to that of Victoria. However, Macquarie Island Marine Park in the sub-Antarctic is managed jointly by the Commonwealth and Tasmanian State Governments. Therefore, excepting Macquarie Island Marine Park, the state managed MPA consists of only 2.2 per cent of the Tasmanian state waters. This is one of the lowest coverage rates compared to other states and territory in Australia. Although Tasmania is a signatory of the NRSMPA, which requires a sufficient number and size of MPAs for a high level of protection of marine ecosystem and habitats at a regional scale (Smyth *et al.* 2003), all of the Tasmanian MPAs combined still do not achieve comprehensive, adequate and representative coverage of habitats. With regard to IUCN Management Categories, more allocation of Ia, Ib or II that provide more strict protection to the marine environment is necessary (Edgar *et al.* 1995; Kriwoken 1993; RPDC 1997).

In addition, some level of fishing is still permitted in several MPAs. According to Mr Koch (pers. comm., 2006), approximately 47% of the Maria Island Marine Reserve is a "no-take" area. Commercial fishing is permitted in the "take" area with protection conferred under the *National Parks and Reserves Management Act 2002,* which does not apply to fish and marine plants. Edgar *et al.* (1995: 46) argued that "the range of biological communities protected within the marine reserve would more than double if fishing was prohibited within the northern section" of Maria Island. In order to maximise the benefit of reserve system, application of a "no-take" zone throughout marine reserves are desirable. Furthermore, current research on Tasmanian MPAs, by Edger and Barrett (in Smyth *et al.* 2003: 33) found that when fishing was not allowed in certain areas, "natural productivity within them returned to levels higher than expected". This suggests "that the impact of overfishing on Tasmania's rocky reefs [is] far greater than first thought".

After the declaration of MPAs, responsible agencies need to provide appropriate management in line with the management objectives. A management plan provides guidelines and procedures. However, even though development and review of management plans is a statutory requirement under the Acts (DPIWE 2000), none of the

seven MPAs in Tasmania has a management plan (Edyvane, pers. comm., 2005). Little progress has been made towards developing guidelines to monitor and to assess MPAs (DPIWE 2000). This is mainly due to insufficient funding; thus, responsible agencies have a limited capacity to implement policies. Additionally, there are different approaches to policy and management for MPAs, by different responsible agencies and an overlap of responsibility (Gartrell 2002; Kriwoken and Haward 1990). In order to improve and overcome these impediments, a more systematic and integrated approach for developing and managing MPAs needs to be taken, and a definite timeframe should be set (DPIWE 2001; ECC 2001; Edyvane and Lockwood 2005).

In addition to the administration for MPA management, community understanding and support cab be vital, both for the declaration and in the post-declaration period. The *Tasmanian MPAs Strategy* outlines that public participation is highly encouraged from in the early development process of MPAs (DPIWE 2000; DPIWE 2001). Moreover, the Strategy argues that active community involvement from the early stage of a MPA development is critically important for achieving goals of Tasmanian Representative System of Marine Protected Areas and "education and awareness of this Strategy is therefore of the utmost importance" (DPIWE 2001: 20). In order to achieve this, the Strategy recommends to:

- develop an education and community awareness program to promote Tasmania's marine biodiversity, habitats and ecosystem;
- develop an education and community awareness program to promote the role and benefits of establishing Marine Protected Areas; and
- investigate and support opportunities to establish community-based monitoring and awareness programs (such as "Dragon Search", "Reef Watch") as tools to raise community awareness of Tasmania's diverse marine environments (DPIWE 2001: 20).

Although Tasmania acknowledges the significance of public involvement, little research has been undertaken to assess current marine education programs at school and community levels and there is a need for their development. Before the Strategy was published, a co-ordinated workshop was held in 1996. It was organised by the *Marine*

Reserve Steering Committee whose members were Parks and Wildlife Service, Marine Resource Division (Department of Primary Industry and Fisheries), MCCN, University of Tasmania and Hobart College. In that workshop, the following plans were determined and assigned to appropriate institutions within certain timeframes as a future direction including:

- fund community education material and presenter – perhaps employ a journalist to assist in getting education message across (Government is an appropriate body to conduct: No timeframe);
- generate community support through an education program (User and interest groups are an appropriate body to conduct: No timeframe);
- review community education project (appropriate body/ies not mentioned: next three months); and
- seek corporate sponsorship for a video and other educational material (appropriate body/ies not mentioned: next three to 12 months) (MRSC 1996: 23-24).

These were significant decisions and could have been crucial for improvement of marine education and awareness programs in Tasmania. Apart from the above points, there are some other decisions which have been implemented. However, very limited achievements have been made in implementing these plans relevant to education.

As pointed out in the Strategy, early community involvement, such as from MPA identification and selection stage, should be enhanced in order to increase ownership of the community. With respect to educational application of MPAs, Edgar (1981) suggests that the establishment of a small MPA in Peppermint Bay where the Woodbridge Marine Discovery Centre (MDC) is located. In this study, Edgar states that besides protection of marine habitat, the marine environment close to the Woodbridge MDC would be ideal location for marine study. After the release of the recommendation, the local government held a public meeting for its discussion. However, the recommendation met unexpectedly strong opposition from commercial and recreational fishing groups, and their lobbying through the Tasmanian Fisheries Development Authority resulted in the withdrawal of the proposal (Kriwoken 1993; Edgar 1984). In addition to Woodbridge,

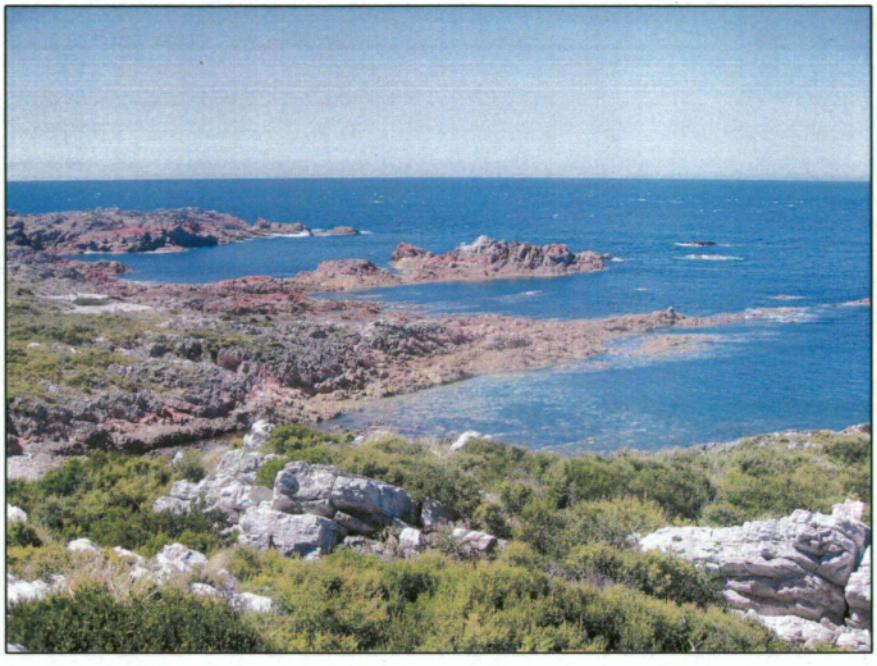
based on numbers of studies, the Marine Reserves Steering Committee (1996) and Edgar (1981) identified the following sites (Table 2.4) as appropriate MPAs, which incorporate a public educational purpose.

Table 2.4 Recommended Marine Protected Area Candidate Sites which Include Educational Use (Source: MRSC 1996)

Name of MPA	Location in Tasmania
Binalong Bay	East Coast
Freycinet	East Coast
Maria Island (Declared)	East Coast
Moulting Lagoon	East Coast
Ninepin Point (Declared)	East Coast
Pirates Bay to Fortescue Bay Area	East Coast
Port Arthur	East Coast
Tinderbox (Declared)	East Coast
Waubs Bay	East Coast
Badger Head	North Coast
Low Head to Five Mile Bluff	North Coast
Mayfield Point	North Coast
Rocky Cape	North Coast
Waterhouse Island	North Coast
Arthur River to Temma	West Coast
Port Davey – Bathurst Harbour (Declared)	West Coast
Sea Elephant Bay	King Island
Coast Adjacent to Strzelecki National Park	Furneaux Group

An additional 14 sites throughout the state are highly recommended as MPAs. A number of studies have been undertaken to seek and assess potential sites of MPAs especially in northern Tasmania. Edgar (1981; 1984) has recommended Rocky Cape (Figure 2.6) as a candidate site in the Boags Bioregion (north coast). It would be the most suitable place to be a MPA because the site hosts representative samples of diverse inshore habitats supported by the complexity of the extensive reef. As Rocky Cape has been declared a National Park, it also provides excellent public access. Although opposition from recreational fishers was received in the area (Barrett and Edgar 1992), the Tasmanian Fishing Industry Council and the Tasmanian Amateur Sea Fishermen's Association have also been playing an important role in selecting potential high protection areas. Barrett and Wilcox (2001) examined the proposed sites for MPAs (Rocky Cape, Three Sisters-Goat Island, Lillico Beach, Low Head and Waterhouse) by TFIC and TASFA. The proposed areas of Three Sisters-Goat Island and Lillico Beach need to be expanded as only limited effectiveness would be provided in their proposed area especially for propagation. Low Head also needs to be expanded significantly to southwards in order to cover deep reef habitats, kelp forests and seagrass beds. Rocky Cape and Waterhouse Point (rather than Waterhouse Island) are again identified as most suitable sites to be protected because of their outstanding richness of marine habitat. Barrett and Wilcox (2001) also point out that these locations can also provide educational opportunities to the public. These factors would be adequate reasons to consider the establishment of MPAs in northern Tasmania and would also fill the

Figure 2.6 Unprotected Marine Habitat Adjacent to Rocky Cape National Park (Northwest Tasmania, January 2006)



shortfalls of the NRSMPA as well.

An examination of the *Tasmanian MPA Strategy* and other relevant literature establishes that there are already frameworks that can enhance public participation through education. However, unfortunately, the Tasmanian government has not made much use of this strategy to date. Their commitment has lacked consistency and limited action has taken place due to political conservatism and resource limitation. As Edyvane and Lockwood (2005), Edger *et al.* (1995) and Leaman (2004) argue, there is a critical necessity to intensify public involvement, through the process of MPA development. This could be achieved by extended formal and informal public marine education. As an essential tool and future priority, well-organised marine education programs should be increased and provided in a long-term framework throughout Tasmania.

2.5 Summary

The aim of this chapter was to introduce relevant issues concerning MPAs, particularly education and community involvement nationally and in two States (Victoria and Tasmania). In fulfilling the aim, this chapter explained MPA policies and strategies, and the development process in Australia. MPA identification and selection criteria and the NRSMPA were also explained by emphasising educational use, followed by IUCN management categories. Then the development history, legislative frameworks and community involvement were presented relevant to MPAs in Victoria and Tasmania. Following this, the challenges for future development and management were examined. Particularly, Victoria's experience of establishing a 24 MPA network in 2002 was assessed as a possible model for the future development of MPAs in Tasmania. The subsequent chapter will examine initiatives of marine education and use of MPAs for marine studies.

Chapter 3

Marine Education

3.1 Overview

This chapter seeks to present an overview of marine education by analysing its history and aims, and the effectiveness of government implementation. The chapter also examines how marine education is delivered at school and community levels. In addition, the role of application of MPAs in education is discussed using examples of the Great Barrier Reef in Queensland and selected MPAs in Victoria and Tasmania.

3.2 Marine Education

Graham *et al.* (1985), state that marine education was introduced through marine research institutions in the 1900s in the USA and Canada to raise community awareness of marine environmental protection among pre-college students and adults. In the mid 1960s, marine education emerged strongly in the USA with the Federal government allocating funds for marine education through the Office of Education of the National Science Foundation. Internationally, marine education was recognised in 1979 when UNESCO produced a "Marine Science Syllabus" for promoting a sustainable environment, which was an educational tool for secondary schools that included coastal and marine related issues in the context of society, economy, politics and culture (Mayer and Fortner 1985).

Graham *et al.* (1985: 172) outlined the aims of Canadian marine education as:

- understanding marine environmental processes;
- understanding the linkages between terrestrial and marine ecosystems;
- developing an appreciation of the relevance of marine environments to our daily lives, and an awareness of the importance of these resources to the quality of human life;
- increasing respect for the marine environment;
- encouraging people's fascination with water and arousing an interest in our distinct Canadian heritage;

- deepening our understanding of this environment and knowledge of specific problems, conflicts and opinions to encourage understanding of and participation in decision-making processes; and
- enriching people's lives through exposure to a variety of learning and leisure activities related to the marine environment.

In contrast, it was not until the mid 1970s that formal and informal marine education was introduced at school and community levels in Australia. This introduction was achieved through by the establishment of Marine Discovery Centres (MDC) and other similar organisations in various states and territories (Moffatt in Sahertian 2002). In 1991, the Commonwealth government launched *Ocean Rescue 2000* with a component for developing a *National Marine Education Program* through the GBRMP Authority with the assistance of other institutions aiming to build capacity for the protection and sustainable use of the marine environment. In addition to the marine education program, *Ocean Rescue 2000* also contributed to the establishment of a *Marine and Coastal Community Network* to encourage community involvement in marine conservation through interaction with local communities and information exchange (Anon n.d.; Kriwoken 1996).

In 1996, the Commonwealth Government launched a *Commonwealth Coastal Action Program.* Through this program, 12 reports relevant to marine and coastal issues were published and report seven, a *Component of the Coastal and Marine School Project* (EA 1997), was undertaken as the first project to assess school marine education in Australia. The project was carried out by the Marine Education Society of Australasia (MESA), the Australian Association for Environmental Education (AAEE) and Macquarie University (Sydney). The project examined available resources, student participation, accessible teacher support, examples of best practice, and connections between coastal and marine subjects, and existing curricula (EA 1997). In 1997, after receiving results and recommendations of the project, the Commonwealth government organised a workshop for teachers aiming to support professional development in the area of coastal and marine studies (Griffith University and the Department of the Environment, Sport and Territories [DEST] 1997).

At a regional level, the National Oceans Office (NOO) released a *South-east Regional Marine Plan* in 2002 (NOO 2002). However, the plan was developed without the involvement of any of the state governments from the southeast region (Smyth *et al.* 2003). In this plan, the development of an *Education Strategy* has been identified as a priority. It was argued that there was little understanding of MPAs and marine education in Australia's southeast marine regional community, despite a high community desire for more educational opportunities (NOO 2002).

In the *South-east Regional Marine Plan*, it is explicitly stated that "a draft education strategy has now been developed by the National Oceans Office. This strategy summarised current national and regional education initiatives, and identified key needs of community education with regard to marine education resources. From this strategy, an *Education Action Plan* has been publicly released" (NOO 2002: 64). The *Education Action Plan* contains some approaches to enhance awareness and knowledge as follows:

- developing and implementing an Oceans Office marine education strategy to ensure that information is provided to all education sectors in an appropriate way;
- to reach the formal education sector, incorporating marine issues in the development of a National Environmental Education Program and, in the short term, developing teaching packages called "tackle boxes", which contain marine education resources for schools;
- for the wider community, supporting the establishment of a Marine Discovery Centre (MDC) network and providing the network with oceans education resources to reach the community;
- for tertiary marine science, education and training, identifying needs and setting priorities for a coordinated Australian Government approach; and
- to provide an avenue for government, industry and communities to explain how the ocean is being used and managed, piloting a "regional" tourism trail which focuses on information about the local marine environment, seafood industries, indigenous culture, and marine science and education (NOO 2002: 64).

However, neither the *Draft Education Strategy* nor the *Education Action Plan* have

actually been published as of February 2006. Although the Commonwealth government recognised the need for the *Draft Educational Strategy* and the *Education Action Plan* within the framework of the *South-east Regional Marine Plan*, there has not been adequate development in this area. It now seems that there is no intention to finalise and release these education initiatives in the near future. As a result, the development of marine education in the region has stalled.

3.3 School and Community Marine Education

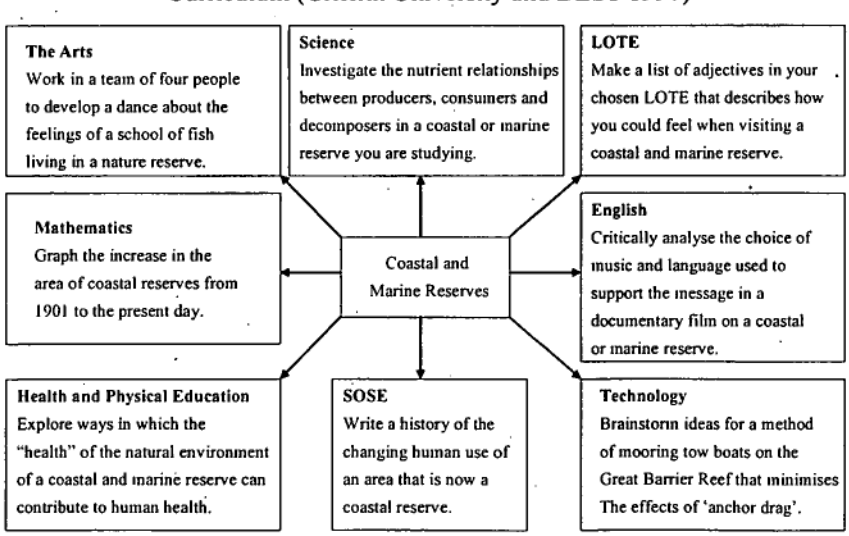
Whilst leadership in marine education from the NOO is absent, there are alternative means for delivering marine education available at both school and community levels. Schools are formal providers of education from primary to tertiary level and are suited for a long-term commitment to marine education. As well as schools, the community provides informal public education opportunities, and its targeted audience can be much wider. Indeed, such audiences can comprise people who have no expertise of marine issues but who have a special connection to the marine environment and include, for example, commercial and recreational fishers, MPA users, divers, and indigenous communities (Parks Victoria 2003; Zann 1995).

At both formal and informal levels, marine education has to be delivered by considering the connections between each area of marine related issues. Graham *et al.* (1985: 172) maintain that the aims of marine education cannot be attained by "one discipline, nor one curriculum area of education, nor by introducing a new course, nor by developing a sub-field within a discipline". Integrating marine education with other existing curricula could maximise its effectiveness and benefits, and it is desirable that there is a long-term commitment. Griffith University and DEST (1997) and Stadler and Thorp (2002) point out that marine education has four main components (politics, society, economy and biophysics), and the following topics would be appropriate to include:

1. biodiversity
2. Marine Protected Areas
3. introduced species
4. recreation and tourism
5. indigenous people
6. transport
7. urban development
8. aquaculture/fishing industry
9. catchment management and water quality
10. contaminants
11. the physical environment
12. ownership/control
13. safety and health

The basic school curriculum has been designed by each state and territory government in Australia through their respective Education Departments. For instance, in Tasmania and Victoria, marine education has been adopted within a curriculum framework called *Essential Learnings* (Department of Education 2003; Department of Education and Training 2005). Within the framework, marine education has been offered together with other courses and subjects. Traditionally, marine studies have been treated as a component of science and biology (Mayer and Fortner 1985). However, it has been pointed out that there are particular connections between marine education and SOSE, maths and english as well as other subjects such as arts, technology and health and physical education (EA 1997). To combine marine related issues with other subjects is called "curriculum infusion" (Mayer and Fortner 1985: 164) or "subject integration" (Griffith University and DEST 1997: n.p.), and marine education has been delivered in that way in a number of Australian schools. Considering the nature of the marine environment and marine education, it is believed that such subjects should be taught in an integrated fashion with other study areas (Figure 3.1) including the terrestrial environment

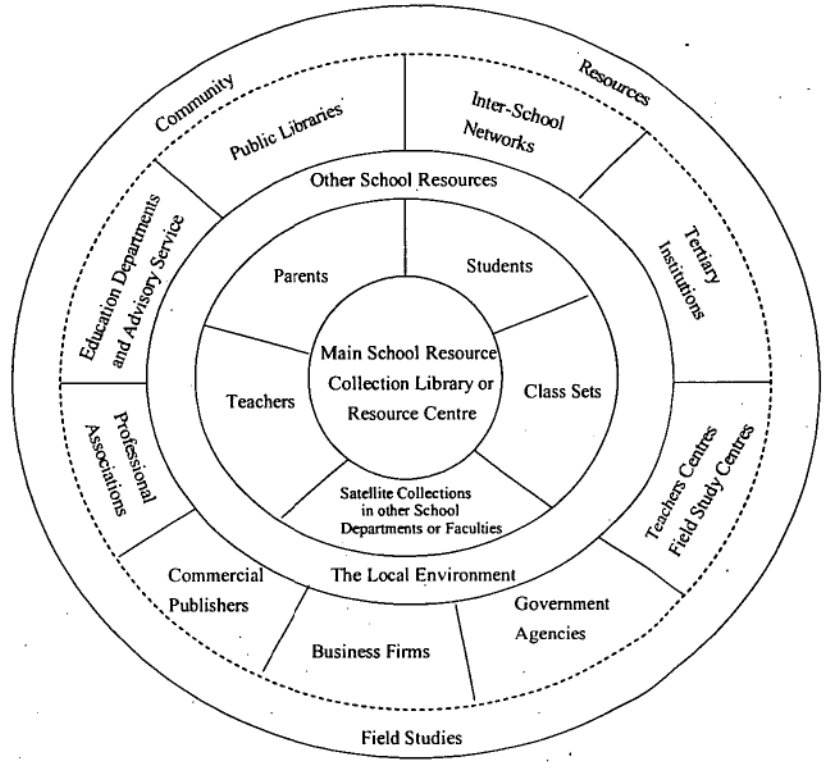
Figure 3.1 Integrating the Study of Coastal and Marine Reserves Across in Curriculum (Griffith University and DEST 1997)



(Graham *et al.* 1985; Stadler and Thorp 2002; Zann 1995).

Marine education is not necessarily taught only at schools. As Figure 3.2 illustrates, the wider community including government agencies, NGOs and commercial sectors can also provide marine education and resources. Although there are a number of institutions that provide marine education in Australia, Marine Discovery Centres have been playing a primary role in implementing marine education, especially for school students in most states. According to MESA (2005), there are five MDCs in Australia and most of them are run by state governments. In Victoria, the MDC is located at Queenscliff, on the shore of Swan Bay, and is a part of the Marine and Freshwater Resources Institute. The Queenscliff MDC is approximately two hours by road and one hour by ferry from Melbourne, the capital of Victoria. Tasmania's MDC is located on the edge of D'Entrecasteaux Channel at Woodbridge and is about one hour by road from Hobart, the capital of Tasmania. The Woodbridge MDC is part of Woodbridge District High School. The major aim of such MDCs is to strengthen understanding of the local marine ecosystem and to encourage people to think about and to take action for marine and coastal conservation (Griffith University and DEST 1997). Both MDCs examined here as case studies, and noted above, have various facilities such as a hands-on discovery area, a touch tank, a laboratory, aquaria and displays of local marine life. They employ professional marine environment staff, and the programs are mainly designed for school students (Queenscliff MDC 2005; Woodbridge MDC

Figure 3.2 Source of Teaching/Learning Materials (Laws 1989)



2003). In addition, a few parents often join the primary and secondary classes with their children (Figure 3.3). As well as these classes, the Woodbridge MDC provides (Figure 3.4) fieldwork for students and open days for the general public and participates in local events. Information such as brochures and pamphlets are also available for all visitors. Through these opportunities, the MDC contributes to enhancing community awareness of the local marine environment (Elliott, pers. comm., 2005). Although MDCs are open for all visitors, their core business is with school students, and as the number of available staff is also limited, educational opportunities for the public are restricted.

Figure 3.3 Primary School Students and their Parents at the Woodbridge Marine Discovery Centre (November 2005)

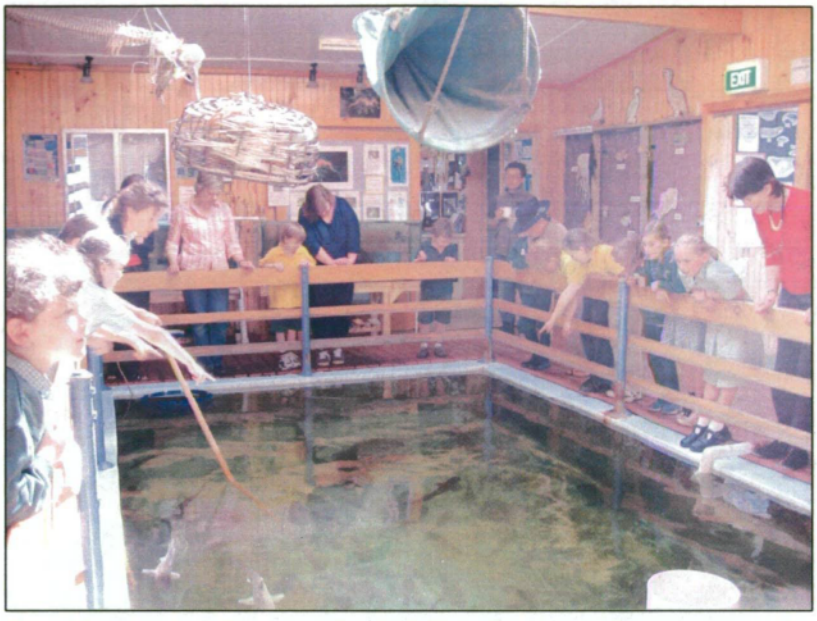


Figure 3.4 Field work of Secondary School Students with a Woodbridge Marine Discovery Centre Staff (November 2005)

As well as classroom activities, fieldwork ranging from a few hours to a week provides significant experience for students. Although field studies can be offered by schools, they require planning and preparation that sometimes can be a burden for teachers who

are not marine experts. Therefore, MDCs offer marine education for students and support teachers. Outdoor education is ideal for deepening students' knowledge on the environment. According to Laws (in Griffith University and DEST 1997: n.p.) the objectives of fieldwork include:

1. Attitudinal Objectives
   - to arouse students' curiosity;
   - to develop favourable attitudes towards learning through enjoyable and meaningful outdoor activities;
   - to provoke students to ask questions and identify problems;
   - to sharpen students' perception and appreciation of changing land and sea scapes;
   - to provide opportunities to explore the pleasure of discovery; and
   - to enjoy the study of coastal and marine related subjects and acquire a deeper interest in these subjects.

2. Knowledge Objectives
   - to develop better understanding of the nature of issues discussed in the classroom and in books;
   - to enable students to think and acquire knowledge through personal experience;
   - to understand the relationships between coastal and marine physical features, marine organisms and human activities; and
   - to develop an awareness of problems relating to human occupancy of the coast and use of marine resources.

3. Skills Objectives
   - to develop an understanding of scientific modes of inquiry;
   - to distinguish between necessary and extraneous information;
   - to use navigational charts;
   - to relate real features to map symbols for navigation; and
   - to develop skills in data collection, recording and analysis.

In addition to these objectives, field studies need to be combined with classroom activities. The active participation of students heightens their interests in the marine environment and their care for the environment. Ballantine (1997) argues that given the fact that understanding of the ocean is very limited, even a child can be empowered through a day trip to a marine and coastal site. In addition, interaction provided by field work also assists in enhancing relationships between teachers and students (Griffith University and DEST 1997).

Although marine education at schools and MDCs does not usually involve the general public, there are some programs open to all. These programs have been contributing to the public's greater understanding of the marine environment. For example, Coastcare and Fishcare provide opportunities for local communities to be involved in their local marine environments. These are Commonwealth Government programs that are run by each state or territory government with their main funding provided by the Commonwealth Government's Natural Heritage Trust (NHT). Appendices 4 and 5 provide a list of those NHT funded programs (1997-2003) that relate to marine education and MPAs.

Although there are numerous other programs funded by the NHT, Coastcare and Fishcare programs are especially involved in the local community and contribute to greater awareness of marine and coastal issues. Coast Action/Coastcare works for the restoration and protection of the coastal and marine environment by aiming to:

- provide funding and advice for coast and marine projects;
- encourage and assist community participation in coastal protection and restoration;
- encourage network and links between the community and land management agencies to help manage the coast; and
- promote coastal awareness through educational activities and events, and provide skill development and training for community groups and land managers (DPIWE 2005; Department of Sustainability and Environment [DSE] n.d;).

In contrast, the Fishcare program focuses on recreational fishers and the public, and it encourages them to be more responsible for their actions in the marine environment, and to care for fish resources. This program is implemented by Fishcare volunteers throughout the states (DSE n.d). Regarding recreational fishing, the *National Recreational Fishing Policy* (Department of Agriculture, Fisheries and Forestry n.d.b) addresses the importance of positively enhancing the ethics of protection of fish stock and their environment and raises public awareness through programs that change people's attitudes and values. Establishment of fishing clubs also plays a considerable role in educating the local community. In addition to this focus on recreational fishers, the importance of education for commercial fishers is also becoming recognised as vital for sustainable fisheries (Zann 1995).

For both schools and communities, an additional important tool for marine education includes web based marine education sites provided by NGOs, governments and community groups. For example, the Friends Group of the Barwon Bluff Marine Sanctuary in Victoria has its own website and their marine education programs and projects are easily accessed. In addition to internet resources, Leaman (2004), Walter and Lien (1985) and Zann (1995) state that media such as television are also major sources of information about the environment and provide an effective means for education.

Although the importance of marine education has been widely recognised, the commitment of governments has only just commenced, and policy and programs are still under development. In addition, several impediments to implementing marine education have been pointed out. Currently, marine education in school is provided mainly within the frameworks of Science and SOSE. However, as argued here, marine education should be taught more broadly, combined with other existing curriculum such as arts, technology, health and physical education. While marine education is provided in certain curriculum frameworks at primary, secondary and tertiary levels, it has been argued that there is no explicit coordination between schools so that teachers might not know what sort of marine education has been provided previously (EA 1997).

There is also an urgent need to provide more in-service training opportunities for

teachers to build capacity to overcome limited understanding and skills. Some teachers are concerned about curriculum overload, which is caused by treating marine education as an independent subject and not integrating it with other subjects. In addition, the limited availability of resources for marine education is also an issue (EA 1997; Griffith University and DEST 1997; Sahertian 2002). Little effort has been made to develop guidelines for best practice because of difficulties in defining areas of marine and coastal study, including field work, and there are still disagreements amongst educators about how best to achieve the outcomes of marine education (Oliver 1997). Furthermore, marine education often involves fieldwork, which brings benefits of "on-ground" experience, but constraints to fieldwork also need to be recognised. For instance, the cost of the trip, limited time for organising and planning, weather limitation, safety issues, limited knowledge of the marine environment and difficulty of supervising large numbers of students, all need consideration. However, local MDCs, community groups, and NGOs can provide their expertise to reduce the burden of fieldwork on teachers (Griffith University and DEST 1997; Zann 1995).

3.4 Marine Education and Marine Protected Areas

Although there are still difficulties in delivering marine education within the framework of school curricula, including problems in doing fieldwork, MPAs have been recognized as suitable places for implementing marine education. Moreover, the majority of MPAs have been established for scientific purposes and some are declared for educational use. There are even some examples in which education is considered as a one of their prime management objectives.

With regard to Commonwealth MPAs, the GBRMP is the best example of an educationally used MPA. The GBRMP Authority has acknowledged education as the most meaningful and cost effective tool for raising awareness of users and the conservation of the marine environment (Alcock 1991 and Kenchington 1990 in Blaymey and Wescott 2004). The Authority and the community also offer educational programs for tourists because of the international importance of the GBR and the development of MPAs can be strongly influenced by marine tourism (Edyvane and Lockwood 2005). Edyvane and Lockwood (2005) also state that tourism is one of the major tools to promote education. In fact, tourists make a large contribution to the

management of the GBR by paying the Environmental Management Charge. In 2003–04, more than seven million dollars came from visitors and it was used for "management, education and research in the Great Barrier Reef Marine Park" (GBRMPA 2006a: n.p).

Supported by relatively adequate funding, there is a range of unique and well organised programs on offer at the GBRMP. For instance, the *Reef Guardian Schools* is an education program for students throughout Australia. It encourages schools to be involved in the conservation of the Marine Park and teaches students to take responsibility for their actions (GBRMPA n.d.a; Leck, pers. comm., 2005).

In addition to education programs, the GBRMP has its own Education Centre called *Reef HQ* in Townsville, Queensland. The Centre provides learning opportunities to students of all ages and other visitors, teaching them about the unique marine environment of the GBRMP. Original education programs, such as the Living Classroom, Reef Sleep, Reef Play and Reef Video Conferencing, have been developed in order to suit students' specific ages and to encourage students to work towards the objectives of their school syllabus (GBRMPA 2006b). Living Classroom offers "interactive activities and investigation challenges, stimulating inquiring minds to discover all they can about the Reef" and the Centre also provides teachers with activities based on curricula for strengthening and expanding student learning. Reef Sleep provides an exciting and safe opportunity for observing the nocturnal habits of the marine life. Reef Play provides "games, activities, storytelling, sing-a-longs and puppet shows" for one to five year old children. Reef Video Conferencing allows users to interact and communicate with other people such as SCUBA divers and to obtain live information and images. It is supported by "comprehensive teaching materials" and enables students to learn about various marine issues (GBRMPA 2006b: n.p.).

In Victoria, five MPAs have been used extensively for educational purposes. Barwon Bluff Marine Sanctuary (Figure 3.5) and Ricketts Point Marine Sanctuary are prime examples that have been extensively used by NGOs, local community groups, and school students. This dedicated local use is what led to increased support for conservation in the area and, as a result, these sites were promoted as marine sanctuaries.

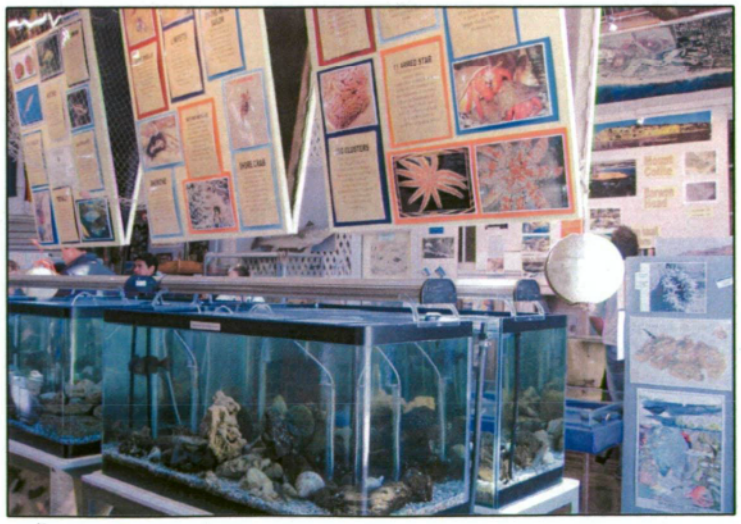
The cumulative experience of local community members at Barwon Bluff Marine Sanctuary contributed to the development of excellent marine education programs. Barwon Estuary Heritage Centre (Figures 3.6 and 3.7) also provide learning opportunities of the local marine environment and contributes to raising public awareness. Additional details are presented in Chapter 4 and in the Appendices. Parks Victoria also recognises the importance of community education, and MPAs can encourage these educational opportunities. In its Management Strategy, Parks Victoria (2003: 78) states that "a highly protected system of Marine National Parks and Sanctuaries increases opportunities for Victorians to learn the marine environment".

In Tasmania, DPIWE (2001:

Figure 3.5 Barwon Bluff Marine Sanctuary in Barwon Heads, Victoria (October 2005)

Figure 3.6 The Barwon Estuary Heritage Centre in Barwon Heads, Victoria (October 2005)

Figure 3.7 Inside of the Barwon Estuary Heritage Centre in Barwon Heads, Victoria (October 2005)



20) also states in its MPA Strategy that "the early involvement and active participation of direct and indirect users of the marine environment, and the community in general, is crucial to the successful development, implementation and management of a Tasmanian Representative System of Marine Protected Areas. Education and awareness ... is therefore of the utmost importance." However, in contrast to Victoria such as Parks Victoria and an education centre, there is a critical lack of financial and community support for the implementation of a strategy regarding the educational use of MPAs in Tasmania.

Although there are seven MPAs in Tasmania, only Tinderbox Marine Reserve (located at the northern end of the D'Entrecasteaux Channel) has been used and managed mainly for educational purposes. According to Mr Hall (pers. comm., 2006), there are two dive trails in Tinderbox, consisting of eight interpretation signs, which were introduced in 1993. These were introduced for educational and recreational purposes such as providing interpretation for divers and snorkellers. The dive trails provided "a safe, sheltered marine study area for education, research and recreation. The natural diversity and educational values are enhanced by its status as a 'no-take' reserve". These educational facilities have attracted a number of users. It was estimated that "during a summer weekend day (Saturday or Sunday) 50 [people visited the reserve] per day and also private operators undertook scuba diving instruction there". Mr Hall stated that the dive trails were "... used mainly by school children and provided an opportunity to introduce the marine environment". Yet, the dive trails have not been maintained and serviced for two years, mainly due to a lack of funding. Dive trails and interpretation signs are still underwater, however, algae growth covers them, so that the signs are hardly visible. Marine markers (buoys) were also introduced to mark boat exclusion zones for snorkellers but they were destroyed and replacement funding has not been forthcoming. Therefore, at this moment (as of February 2006) the public cannot enjoy the dive trails. However, the PWS plans to re-introduce and maintain the dive trails in the near future.

Compared to MPAs in tropical waters such as the GBR, as Edyvane and Lockwood (2005) argue, there is little support and this limits the educational opportunities available to the public in temperate regions, especially in Tasmania. It not only

decreases educational opportunities but also could result in insufficient understanding and support for the local marine environment. Although currently not many MPAs have been used for education, MPAs in temperate waters can be significant educational tools similar to those in the tropics. For instance, MPAs contribute to marine education through providing relatively undisturbed marine environments, especially in "no-take" MPAs. Additionally, MPAs can promote the responsible use of protected areas. Education needs a long-term commitment but it can significantly contribute to changing people's behavior and increased support for conservation (CBD 2004; Kenchington *et al.* 2003; Robinson 1976).

3.5 Summary

This chapter commenced by introducing the history and aims of marine education and explored the Commonwealth Government's commitment to marine education through the NOO. The study found a lack of responsibility in the NOO's development of an *Education Action Plan* and an *Educational Strategy*. Following this, the chapter examined marine education and MPAs. Although there is much theory stated in the Tasmanian MPA Strategy, for example, the actual application of it in practice is lacking. Governments should fulfill their committed obligations and recognize the importance of marine education for schools and the general public. The subsequent two chapters present the results from the research questionnaire.

Chapter 4

Marine Education Initiatives from the Commonwealth of Australia, Victoria and Tasmania

4.1 Overview

In this chapter, marine education initiatives from the Commonwealth of Australia National Oceans Office (NOO), and the States of Victoria (Coastcare, Fishcare, Reef Watch) and Tasmania (Woodbridge Marine Discovery Centre [Woodbridge MDC], Coastcare, Fishcare) are examined. The following themes were selected for fulfilling the aims and objectives of the study:

- existing marine education policies and strategies;
- the promotion of the value of MPAs;
- how MPAs are incorporated into current marine education (and community awareness) programs and which MPAs have been particularly used for educational purposes;
- marine education programs currently offered;
- marine education programs for promoting MPAs, and links between the programs and successful establishment of MPAs;
- resources and funding for implementing marine education; and
- major impediments to the implementation of marine education programs and raising awareness about MPAs.

The Queenscliff Marine Discovery Centre (Queenscliff MDC), Parks Victoria and the Tasmanian Parks and Wildlife Service (PWS) did not participate the survey. The author was able to ascertain information on these three agencies from their respective publication lists and the internet.

4.2 Government Marine Education Providers

The NOO is a branch of the Marine Division of the Department of the Environment and Heritage (DEH). The NOO is the responsible agency for implementing *Australia's Oceans Policy* through a process of regional marine planning. The head office is located

in Hobart, Tasmania. Mr Wilson (Communications Manager) provided the information on behalf of the NOO.

The Woodbridge MDC in Tasmania is the oldest MDC in Australia, located on the D'Entrecasteaux Channel, approximately one hour drive from Hobart. The Woodbridge MDC is run by the Tasmanian, Department of Education and is part of Woodbridge District High School, which is enrolled as one of the trial sustainable schools. It was officially opened in 1979, and since then, it has been providing marine studies for students, parents, visitors and community groups through a "hands on" approach. The Woodbridge MDC is equipped with an aquarium room, a touch tank, displays of local marine habitats and fishing technology (MESA 2005; Sahertian 2002). The information was provided by Ms Foster, Primary Co-ordinator, and Ms Elliott, Secondary Co-ordinator, at the Woodbridge MDC and Ms Smit, a teacher at Woodbridge School.

The Queenscliff MDC is located on the shores of Swan Bay in Victoria, and it is a part of the Marine and Freshwater Resources Institute (MAFRI). The Centre is located at MAFRI's Queenscliff Campus. Queenscliff MDC is approximately two hours by road and one hour by ferry from Melbourne, the capital of Victoria. Similar to the Woodbridge MDC, the Queenscliff MDC provides many types of marine education and activities targeted at school students and other visitors (Queenscliff MDC 2004). It plays a key role in promoting marine education in Victoria.

Coastcare (generally called Coast Action/Coastcare in Victoria) is Commonwealth funded through the Natural Heritage Trust (NHT), in cooperation with state/territory and local governments (EA and Department of Agriculture, Fisheries and Forestry 2004). The program contributes to raise public awareness for the conservation of the marine and coastal environment through community participation. The Department of Sustainability and Environment (DSE) and DPIWE are the main responsible agencies in Victoria and Tasmania, respectively. Mr Cox (Facilitator, Port Phillip East region, DSE), Mr Forster (Facilitator, Gippsland region, DSE) in Victoria, Ms Fazackerley (Facilitator, South region, DPIWE) and Ms Wind (Facilitator, Cradle Coast region, hosted by the Burnie City Council) in Tasmania provided the following information.

Fishcare is also a Commonwealth government funded program, through the NHT and is supported by each state/territory government (EA and Department of Agriculture, Fisheries and Forestry 2004). Fishcare contributes to educating recreational fishers through volunteers, in cooperation with facilitators. The role of the Fishcare facilitator is undertaken by government officials (in Tasmania) or other frameworks such as incorporated organisations (in Victoria). This information was provided by Mr Green (Secretary, Fishcare Mornington Peninsula Inc, Victoria) and Ms Brown (Management Officer, DPIWE, Tasmania).

Reef Watch is a non-profit project that has been set up by Museum Victoria, and is run by the state government. The project has been developed with the assistance of the Australian Marine Conservation Society and the Marine and Coastal Community Network in order to monitor the Victorian marine environment through volunteer divers and snorkellers (Reef Watch 2005). Ms Roberts, a coordinator of Reef Watch provided the information.

Parks Victoria is the major management body of both terrestrial and marine protected areas in Victoria. It also has Marine Park Rangers and education programs for each marine park and sanctuary (Roberts, pers. comm., 2005). Since 2002, Parks Victoria has been emphasising educational initiatives and programs to raise public awareness and strengthen understanding of the marine park system.

The PWS is the main body managing national parks and reserves in Tasmania. Currently the PWS is in the Department of Tourism, Parks, Heritage and the Arts. Formerly, it was under DPIWE but with structural reform, it was repositioned. Currently, Tasmanian marine reserves are jointly managed by DPIWE and the PWS. Although a temporary officer has been allocated to the management of marine reserves in October 2005, no funding has been allocated to employ a full time officer.

4.3 Marine Education Policies and Strategies

Mr Wilson (pers. comm., 2005) stated that "the NOO and other branches within the Marine Division have been involved in a number of national and regional events, including conferences, National Science Week activities and festivals". However, no

specific policies and strategies on marine education were provided. It was also stated that "[t]he National Oceans Office, through an action of the South-east Regional Marine Plan, has funded the development of a national network of Marine Discovery Centres, providing them with resources for use of, and distribution to school groups". Developing the national network of MDCs is also mentioned in the *South-east Regional Marine Plan* (NOO 2002b) as one of the initiatives of an *Education Action Plan.* However, the Education Action Plan has not been finalised or released by the NOO. Therefore, it is arguable whether that initiative has been implemented or not. The respondent also suggested that "DEH provides very substantial funding annually to the Marine and Coastal Community Network" which is heavily involved in local community awareness activities. Yet, the Victorian MCCN has been closed for approximately six months as of February 2006, due to a lack of funding. If the Victorian MCCN had received "very substantial" resources it seems unlikely that the office would have been closed. This indicates a difference in perception regarding the annual funds allocated to the MCCN by the Commonwealth Government.

The Woodbridge MDC aims to "challenge students of all ages to learn about, discover and care for the marine environment through diverse shore and sea based programs. Programs for students from K-12 are designed to be as hands-on as possible" (Elliott, pers. comm., 2005). All programs at the Centre are based on National Standards and the Tasmanian Department of Education *Essential Learnings Framework* and programs are developed using sound educational practices. However, a teacher from the Woodbridge School argued that "there are no specific marine education policies or strategies" at the Woodbridge School (Smit, pers. comm., 2005).

Victorian Coast Action/Coastcare is assisted by the DSE and works closely with Parks Victoria. It has been in place for more than 11 years supporting and providing awareness activities and training for local volunteer groups. The objective of the project includes the establishment of "community engagement" for MPAs (Forster, pers. comm., 2005).

In Tasmania, a respondent from Coastcare (Southern region) argued that although there was no clear strategy for their work plan, the major aims were to "help to raise awareness of coastal and marine issues in the community and to encourage and support

community groups in raising awareness within their local community" (Fazackerley, pers. comm., 2005). Another respondent from Coastcare (Cradle Coast region) provided the following points as their policies and strategies:

- assist the community and stakeholders to access advise and information on best practice coastal and marine management;
- work closely and encourage community participation in coastal and marine management;
- capacity building of regional NRM [Natural Resource Management] staff to address coastal and marine issues and work with coastal and marine stakeholders; and
- assist in the implementation of coastal and marine projects (Wind, pers. comm., 2005).

With regard to Victorian Fishcare, no specific policies or strategies for marine education were found. However, Mr Green (pers. comm., 2005) mentioned that whenever they attend community activities they bring Victorian marine park maps, which are supplied by Parks Victoria to show the location of MPAs to the public.

In contrast, Tasmanian Fishcare has an explicit policy and strategy for raising public awareness and education both at school and community levels. Ms Brown (pers. comm. 2005) stated that:

> As part of the Agency's policy Recreational Fisheries Management is responsible for the public awareness of fisheries management, liaison with community groups, and the facilitation and development of education and awareness programs. A number of different strategies have been adopted to affect this policy. The Fishcare Volunteer Program is the primary mechanism of delivery and provides a number of avenues within the program to achieve that objective. The main dissemination methods adopted by this program include a schools education program, a system of volunteer liaison at fishing sites around Tasmania and displays at major events. A variety of support material such as brochures, guides and fish facts are produced and distributed. A schools education package complete with resources is also distributed by this group.

Reef Watch in Victoria provided clear policies and strategies. "Reef Watch aims to raise community awareness of Victoria's marine temperate environment by involving volunteer divers and snorkellers in monitoring sub-tidal reef systems along the entire Victorian coastline (not just Marine National Parks and Sanctuaries)" (Roberts, pers. comm., 2005). Marine seminars and workshops assist divers to improve their knowledge on identifying marine life and the Reef Watch website provides relevant information. Reef Watch belongs to the Marine Science Department of Museum Victoria therefore, access is available to scientists and updated marine research.

4.4 The Promotion of the Value of Marine Protected Areas

Mr Wilson (pers. comm., 2005) stated that the NOO "focuses its promotions on regional marine planning, of which MPAs in Commonwealth waters are a part". "The Marine Conservation Branch promotes the values of MPAs in accordance with Australia's Oceans Policy". Indeed the policy states that "it is essential a national representative system of MPAs is established as quickly as possible both for conservation purposes and to give regional security for industry access to ocean resources" (DEH 2002: 23).

Ms Foster (pers. comm., 2005) and Ms Elliott (pers. comm., 2005) from the Woodbridge MDC and Ms Smit (pers. comm., 2005) from Woodbridge High School maintained that "biodiversity conservation is the main value" of MPAs values. Recreational values and fishing are discussed as well as biodiversity conservation, especially in secondary schools.

As regards to Coast Action/Coastcare in Victoria, all the values of MPA are promoted especially "biodiversity conservation and recreational values" (Cox, pers. comm., 2005; Forster, pers. comm., 2005). Besides, "erosion, waste reduction and other issues that impact on the marine environment are highlighted" and "coastal land based education is more emphasised in general" (Cox, pers. comm., 2005). Ms Fazackerley, Tasmanian Coastcare staff, (pers. comm., 2005) argued that MPA values consisted "... a bit of all (biodiversity conservation, integrated management, fisheries tool, education, social and recreational values) ... depending on the stakeholder group being targeted". Ms Wind pointed out three values for MPAs were "biodiversity, education, recreational values".

Victoria's Fishcare promotes two main values which are "the environment and biodiversity". "We are a fisheries voluntary group and do not possess the skills or knowledge to advise in areas other than the two mentioned" (Green, pers. comm., 2005). In Tasmania, biodiversity conservation has been promoted as a main value of MPAs as well as recreational values by Fishcare. Reef Watch also commented that they promote biodiversity conservation, integrated management, fisheries tool, education, social and recreational values (Roberts, pers. comm., 2005).

4.5 How Marine Protected Areas are Integrated into Marine Education

The response from the NOO indicated that "there are currently no explicit MPA messages in the NOO program" (Wilson, pers. comm., 2005). However, "it is likely that MPA promotional and explanatory publications will be incorporated in displays and exhibitions in the future, following the absorption of the Office into the newly created Marine Division of DEH, where the Marine Conservation Branch, responsible for MPAs, also resides". A number of educational materials such as explanatory booklets, pamphlets, maps and calendars to promote MPAs have been produced by the Marine Conservation Branch. With regard to using MPAs for marine education, the respondent suggested that "none of them have been targeted for marine education purposes as such but all Commonwealth MPAs have been the subject of community awareness materials". Commonwealth MPAs declared beyond three nautical miles are less likely to be used for marine education purposes because access is a problem, therefore limiting educational opportunities.

The Woodbridge MDC provides various marine education programs appropriate to the level of the students. At primary level, MPAs are discussed in relation to local marine environment such as kelp forests, sharks, food chains and whales. These elements are discussed with teachers in order to fit them in to students' unit of work. At junior secondary class, students complete a "Fishing for the Future Program which also looks at the role of Marine Protected Areas in managing fisheries" (Elliott, pers. comm. 2005). At senior secondary level, biodiversity, marine monitoring and the role of science in the management of our marine resources including setting up and managing MPAs are the focus. Parents, especially of primary school students, are also welcomed to join the

programs with their children. In addition to these programs, pamphlets about marine reserves in Tasmania are available for all the visitors to encourage individual learning. At the Woodbridge School, MPAs have been also "incorporated through the Fishcare program" (Smit, pers. comm., 2005).

Regarding usage of MPAs, representatives from the Woodbridge MDC stated that they "don't sample in Marine Reserves but Ninepin Point is used by some of our visiting schools who stay for a week for snorkelling but by far the most accessible for the general community is Tinderbox" (Foster, pers. comm., 2005). When promoting the use of MPAs for educational purposes, accessibility is one of the important points to consider. From this perspective, Tinderbox is an ideal MPA for education because it is the nearest MPA to the Woodbridge MDC and Hobart. The use of new technology was mentioned where "the availability of underwater cameras (on *Peppermint Bay II*) are very powerful ways to convey the importance of protecting our marine environment" (Elliott, pers. comm. 2005; Foster, pers. comm., 2005).

Since the establishment of a network of 24 MPAs in Victoria, Coast Action/Coastcare has supported education as its primary goal and educational activities such as rock pool walking and boat tours to MPAs are offered through Summer Activities Program (Cox, pers. comm., 2005; Forster, pers. comm., 2005). Coast Action/Coastcare also assists "the development of a Friends of Network for MPAs and a new program called Marine Care" (Forster, pers. comm., 2005). However, Mr Forster stated that "more information needs to be provided as to why any given area was chosen to be an MPA". The DSE issues a newsletter of Coast Action/Coastcare program, four times a year. It includes information about public and school educational activities and events and it works as the key communication tool in Victoria. Many events and activities are relevant to MPAs. According to Mr Forster, none of the three MPAs in Gippsland region provide easy access to the public. However, dedicated local volunteers have carried out a project funded by NHT and surveyed marine reef life, which has successfully resulted in raising community awareness. The Barwon Bluff Marine Sanctuary has been used extensively school marine education. Respondents indicated that there were some other MPAs which were well utilized for educational purposes. Mr Cox (pers. comm., 2005), however, questioned "whether school education at the reef be encouraged or not"

because the reef could be damaged due to overuse.

According to Tasmanian respondents, MPAs are unlikely to be treated as a major concern of Coastcare. Coastcare receives current information of existing and newly proposed MPAs from the PWS (Fazackerley, pers. comm., 2005). Ms Wind (pers. comm., 2005) maintained that MPAs are generally incorporated into current marine education and community awareness programs, however, there are no MPAs in the northwest, although there is "the proposed Rocky Cape MPA which is the longest standing proposal in Tasmania. Generally, it is not part of my role to promote MPAs, but general marine conservation is promoted when I talk to students including the problems of marine debris".

4.6 Marine Education Programs Currently Offered

The NOO provides marine education programs to schools (http://www.oceans.gov.au/education/home.jsp). In addition, an Environmental Education Unit at DEH provides environmental education resources which include marine components. The Unit was also involved with implementing the National Action Plan for Environmental Education that was discussed in Chapter 3. The respondent also mentioned a new project which is in the early stages of development. The project aims "to communicate the nature and benefits of MPAs in remote Indigenous communities in the Northern Territory, for which some community awareness materials will be produced" (Wilson, pers. comm., 2005).

The Woodbridge MDC provides marine education programs mainly for school students because the MDC is a part of the Department of Education. Five to eight parents are invited to participate in all primary classes and some secondary classes, so that programs can contribute to the community. Groups such as U3A (University of the 3rd Age), Rotary, University of Tasmania and TAFE (Technical and Further Education) students, exchange students and teachers from other countries also participate in the programs. The MDC also runs a public Open Day every two years, as well as special activities for children and their parents during June and September holidays, public expos, Threatened Species Day, and some fairs and shows. Therefore, even if the programs of the MDC focus on school students, the MDC has contributed to raising community awareness of the local marine environment (Elliott, pers. comm., 2005).

During the week, however, when the MDC accepts students, there are no staff to look after general visitors. The MDC is closed most weekends and school holidays, except these open days too. Therefore, limited educational opportunities for the public are provided compared to the private sector such as aquariums.

Appendices 6 and 7 provide lists of education programs currently available at the Queenscliff and Woodbridge MDCs respectively. These were compiled from the internet based information. The themes of the programs vary from science to arts, and some programs are designed across different subject areas called "curriculum infusion". These programs are delivered by classroom activities or field trips. The Woodbridge and Queenscliff MDCs emphasise practical and real experience which assists to deepen the knowledge of the student and increase involvement with the marine environment (Ballantyne and Uzzell 1994). In addition to the daily programs, both MDCs provide special programs such as a few days or week-long programs during school and summer holidays (Queenscliff MDC 2004; Woodbridge MDC 2003). Staff from the Woodbridge MDC also visit schools throughout Tasmania (Woodbridge MDC 2003).

Neither Coastcare in Victoria nor in Tasmania, provide regular programs. However, occasionally, particularly in summer, a number of programs are planned in collaboration with other government agencies and local community groups. Appendix 8 lists marine education programs, projects and events and their specific details. In addition to the listed programs, Mr Cox (pers. comm., 2005) suggested that in Victoria, "the Phillip Island Nature Park (PINP) offers activities to students and public from early summer through to Easter, many of the activities are focussed on the marine environment. The PINP also run a Coastal Ambassador program that takes keen secondary students and trains them for a week with marine biologists at Phillip Island. Parks Victoria provides some marine education to local schools, fishers and the public through Ranger interpretation".

With respect to Victorian Fishcare, Mr Green (pers. comm., 2005) suggested that "when speaking to members of the community, we ensure that they are aware of the existence of MPAs and their rules and regulations that apply within them. We also advise why that particular area was chosen as a MPA". At present there are no educational activities in

the Mornington Peninsula, however, he pointed out a proposal which will be forthcoming. "This proposal is to be conducted by the Australian Maritime College [AMC] in Tasmania and their research vessel the *Bluefin* was here in Victoria doing some preliminary work on this venture which is to be based at Point Nepean, which has been handed over to the Victorian State Government by the Commonwealth Government and was the subject of much debate and public protest". The MPA is located adjacent to Port Phillip Heads. Involvement of relevant institutions could make a MPA a suitable site for educational use. "That area was chosen as part of the AMC proposal is to establish a uni[versity] campus and suitable buildings and infrastructure already exists on the shoreline of the Marine Park, with the Rosebud TAFE and MDC at Queenscliff both close by. Point Nepean is an old quarantine and military area that has been decommissioned and the buildings still are usable" (Green pers. comm., 2005).

Regarding Tasmanian Fishcare, Ms Brown (pers. comm., 2005) pointed out the "MPA information is included in the recreational fishing guide that is distributed automatically to license holders and also distributed by the volunteers at events, displays and school talks". To raise the public awareness of MPAs, interpretation signs were erected in Tinderbox, Governor Island and Ninepin Point. The first two sites received more visitors than Ninepin Point because they are close to populated areas therefore the signs were effective. However, there has been less interaction with Ninepin Point. She also stated that "there are no current projects that I am aware of, however, there have been a number of projects within the Tinderbox MPA (close to Hobart) to control the introduced alga Undaria".

Appendices 9 and 10 present activities offered by Fishcare in Victoria and proposed projects by Fishcare in Tasmania. In Victoria, programs are mainly targeted at school students. In Tasmania, proposed projects (2005-2006) are listed and many of them include an educational component. Some of the projects have been developed and will be implemented with collaboration between government agencies and academic institutions. Proposed projects include school education programs carried out by trained Fishcare Volunteers and some funding will be allocated for producing and renewing brochures and posters.

Reef Watch provides slightly different educational opportunities to the public, especially those who dive and snorkel. By providing assistance to organisations and divers to monitor the local marine environment, Reef Watch also assists self development of participants. They monitor sub-tidal sites that are "any where along the coast (down to 20m and out to state limit of five km) and are not necessarily located in Marine National Parks or Marine Sanctuaries" (Roberts, pers. comm., 2005).

Ms Roberts pointed out that the following MPAs are often used for educational purposes in Victoria:

- Rickett's Point Marine Sanctuary;
- Jawbone Marine Sanctuary;
- Barwon Bluff Marine Sanctuary;
- Point Addis Marine National Park; and
- Merri Marine Sanctuary.

The first two sites are close to Melbourne and are therefore highly visited. Barwon Bluff Marine Sanctuary is near to the Queenscliff MDC. There is a private company which undertakes marine education classes at Point Addis Marine National Park, therefore the site has been heavily used for educational activities.

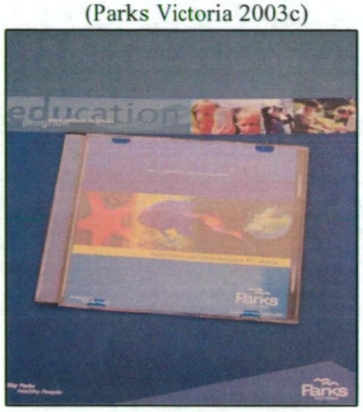
Parks Victoria has also developed a number of education programs. The programs also include terrestrial components but can be largely applied to the coastal and marine environmental education. Appendix 11 outlines available programs, details of activities and expected objectives. The education programs have been developed in order to suit the school curriculum and the programs cover a range of topics such as park regulations, endangered species and human impact on the environment. In addition to the education programs offered, Parks Victoria has developed various education resources in partnership with NGOs and community groups based in Victoria, including the Dolphin Research Institute, the Queenscliff MDC, Coast Action/Coastcare and Friends groups. An education kit has been produced to inform the community of the following:

- the values of Marine National Parks and Marine Sanctuaries;

- attitudes that support the long term protection of these environments; and
- the skills and willingness to take action to protect and maintain the values of these environments (Parks Victoria n.d.).

Figure 4.1 shows Marine National Parks and Marine Sanctuary educational materials that are available from the Parks Victoria Information Centre. Many of them are also found on the internet which allows wider access to the public. These education materials are suitable for a wide audience from primary school students to adults. A booklet and pamphlets for children are especially designed to appeal to their interest in marine parks and sea animals.

Figure 4.1 Marine Education Kits (Parks Victoria 2003c)



In Tasmania, the PWS has been involved in education and awareness raising activities, however, no regular marine education programs were found through this research. The PWS developed an internet based project titled the *Shipwrecks, Sealers and Scientists on Macquarie Island Internet Project* with students of Fahan School, Sandy Bay. The project activities were designed for students in Years seven to ten. This project included a number of activities such as games, a debate and writing a journal that covered history through environmental issues. Activities were suitable for both individual and group collaborative work (PWS 2005a). The details of the activities are presented in Appendix 12. The PWS has also produced a "Tasmanian Threatened Species Education Kit" that includes sea animals.

Apart from the education projects already mentioned, there are some other occasional and irregular marine education programs that are provided by government agencies in Victoria and Tasmania. Some of them are developed and implemented by collaboration of several government agencies. Appendix 13 presents the responsible agencies, their programs and activity details.

4.7 Marine Education Programs for Promoting Marine Protected Areas, and Links between the Programs and Successful Establishment of Marine Protected Areas

Mr Wilson (pers. comm., 2005) indicated that "simple displays would be useful" as

effective education activities. "I couldn't specifically locate any links between programs and MPAs, although a number of explanatory pamphlets (including maps) targeting commercial and recreational fishers have been useful in ensuring compliance with MPA regulations in some Commonwealth MPAs".

At the Woodbridge MDC, programs include some details about MPAs. However, Ms Elliott stated "I am currently only aware of the pamphlets which we have distributed through the Centre as well as some posters we have received" for MPA education (Elliott, pers. comm., 2005). The response indicates that no programs which are specially targeted to promote values of MPAs are offered at the MDC. With respect to links, the respondent suggested that "I think there is a link between effective programs and increasing acceptance by the wider community of the need for MPAs and thus greater support by the politicians who make the decisions". Therefore, the respondent argued that educational opportunities need to be provided to all stakeholders to discuss their concerns, encourage their participation and develop their ownership of the proposed MPA at an early stage.

As for programs, Mr Cox (pers. comm., 2005) from the Victorian Coast Action/Coastcare pointed out that the following events raised the profile of MPAs; "occasional specific training days, forums for community groups, and World Environment Day for schools". These events attracted more than 1200 students each year at San Remo and Casey. Mr Forster (pers. comm., 2005) pointed out that slide nights and movies showcasing the underwater environment, and hands on activities such as rock pool rambles and other field trips are also effective to raise community awareness on the local marine environment. Mr Cox (pers. comm., 2005) argued that it is too early to examine links with education and MPAs because it just has only been three years since the establishment of the marine parks system. According to Mr Forster (pers. comm., 2005), "through a recent campaign to raise awareness of the Natural Resource Management value of Beware Reef Marine Sanctuary, community interest and appreciation of this MPA has significantly increased. Many more people have now taken interest in temperate marine ecology".

Ms Fazackerley (pers. comm., 2005), Tasmanian Coastcare stated that the Woodbridge

MDC and field experiences such as a snorkelling or visiting MPAs, are events relevant to MPAs especially for young students. Ms Wind (pers. comm., 2005) maintained that "travelling MPA road shows to school and to events" would be effective. With regard to links, "I consider there would be a link, especially if education programs focus on schools" (Wind, pers. comm., 2005).

Victoria's Fishcare uses MPA maps in marine education. Mr Green (pers. comm., 2005) said that "my group, as an example, took photographs of the MPA markers, had them enlarged, and made into a poster so that we can show people what to look for". This is useful to show the location of MPAs. In addition, Fishcare makes the most of their opportunities to raise public awareness on existing MPAs in Victoria. With respect to links, Mr Green explained that little information is available because Victorian MPAs have only been declared for three years. He noticed that "Fisheries Victoria have increased patrols in the parks over the past year with a resultant increase in the number of infringement notices being issued". He argued that it might be "due to the lack of education of the existence of the parks", or it might be "due to lesser fishing pressure hence larger catches for those taking the risk and fishing there in the hope of not being caught".

Regarding successful education methods, Ms Brown (pers. comm., 2005) from Tasmanian Fishcare argued that "this depends very much on recognising the target audience and the method of delivery". She stated that suitable tools should be used at suitable places. For example, "brochures are the easiest method of circulating information at events and shows where a video would have no impact". "However, in a classroom a video would work but not brochures".

Ms Roberts (pers. comm., 2005) from Reef Watch, pointed out that an educational website and CD Rom created by the Barwon Bluff Marine Sanctuary Friends Group is a good example of successful marine education program. "It is a total marine education package produced by the people who care for the sanctuary and they recently won a Banksia Award for their work". She also indicated that a new project is being developed at the Port Phillip Heads Marine National Parks to involve divers to monitor the 'Heads', photograph the marine life and develop a poster and a calendar to distribute to the local

community".

Regards to links between MPAs and marine education, Ms Roberts (pers. comm., 2005) suggested that Ricketts Point Marine Sanctuary was the one of the best examples of an area that became a MPA because of intensive educational use. She stated that "it may not have become a sanctuary if it had not been a site for marine education programs". She argued that the following factors assisted the site to become a sanctuary:

- A very active conservation group had monitored the marine and birdlife for 30 years.
- The Gould League conducted marine education programs there for many years. It is the closest Marine Sanctuary to the Melbourne Central Business District.
- The MDC at Queenscliff has been teaching marine education to Victorian students for 21 years. Tens of thousands of children, parents and teachers have a greater awareness of Victoria's marine environment as a result of the work of the centre.
- The Marine and Coastal Community Network established a newsletter and 'Radio Marinara' on Radio RRR-when the debate on Marine National Parks arose in the 1990's, the value and importance of MPAs could be communicated via this network.

4.8 Resources and Funding for Marine Education Activities: Are they Sufficient?

Mr Wilson (pers. comm., 2005) from the NOO indicated that "the DEH has an Environmental Education Unit but there are no dedicated resources purely for the promotion of marine education". The respondent was not willing to comment on resource allocation. "However, there is always more that could be spent to promote marine education and projects targeting MPAs". For example a "plain English description of the purpose of MPAs backed by international examples of their success in preserving biodiversity would be of undoubted use". Resources and funding was a function of "balancing ... taxpayers' money against other priorities, including the funding of MPA development and management".

The Woodbridge MDC is wholly owned and resourced by the Tasmanian Department of Education. According to the respondents, the resources include "recurrent funding of $25,000 annually plus the salaries of 1 full time technician, 1 full time skipper plus a part-time admin[istrative] officer, a part-time aquarist and a part-time teacher" (Elliott, pers. comm., 2005; Foster, pers. comm., 2005). The MDC is also supported by volunteers who help classes, create displays and collect resources. "On average, we have two volunteers spending at least four hours each at the Centre per week".

Although the MDC considers that allocated resources are adequate for current demand, more will be required to improve and expand the current facilities. For example, "information and resources for Marine Protected Areas are either several years old (e.g. the pamphlets produced by DPIWE) or other material sourced from the web" that need to be updated (Elliott, pers. comm., 2005; Foster, pers. comm., 2005). The respondents considered that it would be good to add "educational activities or resource books for teachers specifically targeted at MPAs" and "it would be great to have visiting scientists join our Scientific Visitor Program available to talk to secondary school groups specifically about MPA management" (Elliott, pers. comm., 2005; Foster, pers. comm., 2005). In contrast, Ms Smit (pers. comm., 2005) from the Woodbridge School argued that resources and funds are not adequate at school marine programs and said that "the State government [should] support [more] local awareness around the state".

Regarding resources, Mr Forster (pers. comm., 2005), stated that sufficient funding has been allocated and over a hundred volunteers are involved with Coast Action/Coastcare. "Now each of the 7 Facilitators provide local training as appropriate" in Victoria (Cox, pers. comm., 2005). Ms Fazackerley (pers. comm., 2005) stated that Coastcare in southern Tasmania put more focus on coastal issues rather than marine. The respondent argued that "there could always be more resources for this area". While Ms Wind (pers. comm., 2005) maintained that no resources and funds, including volunteers are available in northeast region and she argued that "a SeaNet or Marine facilitator or educator" needs to be appointed.

The response from Victorian Fishcare explains the difficulty of implementing their training and activities due to a lack of resources. "We have no paid staff in our

organisation although we report to a part time facilitator at the Department of Primary Industries (DPI)" (Green, pers. comm., 2005). With respect to funding, Victorian Fishcare receives $3000 per year from the Fisheries Revenue Allocation Committee (FRAC) whose main income is selling of Recreational Fishing Licences. "From this $3000, we must fund our organisation's administrative and operational costs, which leave little for other programs or projects. Funding for these must be found by way of grants". There are 12 volunteers in Mornington Peninsula group and approximately 120 Fishcare volunteers, in six groups, work throughout Victoria.

According to Mr Green (pers. comm., 2005), the core activity of the Fishcare program is marine education. However, "we receive little or no training after our initial induction training, and have to rely on ourselves to be self taught". Victorian Coast Action/Coast Care commenced a new course called "Coastal Ecology" from May 2004 that costs $600. The cost of $600 "is a huge slice, 20 per cent out of our total funding of $3000 (Each of the six groups receives $3000) so sponsorships are being sought". There are also other short courses such as Marine 1 and 2 that are offered at TAFE. Therefore, Mr Green suggested that "the main resource we need is funding to attend suitable training courses and seminars that specifically focus on marine education".

In Tasmania, one Full Time Equivalent (FTE) and two at 0.75 FTEs are allocated for the Fishcare Volunteer Program. There are about 80 Fishcare volunteers throughout the State. In addition, one FTE is funded for a Communication officer. "Core funding is allocated by the Dept. [DPIWE] and supporting funds are sought from project applications" (Brown, pers. comm., 2005). Although no particular funds are allocated for MPA education, Fishcare volunteers can distribute relevant items if they are available. "Extra funding would need to be available to undertake" a particular project on MPA education.

Reef Watch is coordinated by one part-time (0.5) staff and a volunteer manages the website. There are 225 registered volunteers and Melbourne Aquarium also supports Reef Watch by providing two part time staff (8 hours a month) to help with seminars and workshops (Roberts, pers. comm. 2005).

4.9 Major Impediments to the Implementation of Marine Education Programs and Raising Awareness about Marine Protected Areas

Mr Wilson (pers. comm., 2005) from the NOO suggested that "like any other government program, there are funding limitations within which the Marine Division of DEH must operate. There are no impediments as such".

As respondents stated in the previous section, the Woodbridge MDC currently receives a sufficient budget. However, more resources (staff and funding) or resources from external bodies would be ideal to improve displays including ones relevant to MPAs (Elliott, pers. comm., 2005; Foster, pers. comm., 2005). A teacher from the Woodbridge School pointed out "political conservatism" is the major constraint to increased marine educational funding (Smit, pers. comm., 2005).

No response was available from Victorian CoastAction/Coastcare. In Tasmania, Ms Fazackerley (pers. comm., 2005) pointed out the difficulties for implementing education programs caused by a change in funding. "During the Coastcare funding program there was quite a bit of progress in this area but with Envirofund the focus must include on ground works and also excludes counting student time as an in kind contribution during school hours. This limits the funding available for educational type projects". It implies that the change was not positive from an educational perspective, since it does not encourage education components within the new funding framework. She suggested that "some wild interactive website material and also so on the ground educational material ... with a focus on below the high tide mark" would be ideal addition. Ms Wind (pers. comm., 2005) stated that "it is not part of my job description to promote MPAs".

The respondent from Victorian Fishcare argued that a lack of full support from the Department of Primary Industry (DPI) is the main constraint. Mr Green (pers. comm., 2005) pointed out some specific problems that "in fact this year they have decided not to feature Fishcare (their own volunteer program) in the 05/06 edition of the Victorian recreational Fishing Guide unless we pay $2500 for the privilege", even though a half page was provided in the last two editions of the guide. The other difficulty is "each Fishcare group in Victoria is an Incorporated Association, and therefore is not directly

funded by the state government as the Fishcare program is in every other state". There is an elected committee for each volunteer group and "many of these office bearers lack the business skills to seek out and apply for grants that are available". This limits available funds which results in small number of activities they can attend. The lack of funding also restricts the purchase of even necessary equipment such as computers, and core office supplies, including binders and laminators. Moreover, Mr Green pointed out that bureaucracy can hinder smooth implementation of activities regarding MPAs because the major management body is Parks Victoria, while Fishcare belongs to the DPI. Parks Victoria supports their own volunteer groups from their funding, however, the funding does not go to Fishcare volunteers even though both volunteer groups are involved in marine education. In Victoria, "it is a mishmash of organisations as Parks Victoria has the control of Marine Parks, the DPI the enforcement of fishing regulations within the park and DSE are responsible for mammals (seals, dolphins etc) within the park as they are considered as wildlife". In addition, even though wildlife rangers are under the DSE, "the DSE has no boats for patrolling Marine Parks". Regarding this section, no comment was available from Tasmanian Fishcare.

Ms Roberts, Reef Watch, (pers. comm., 2005), pointed out the following two constraints to the implementation of marine education and awareness programs. Funding from DEH has reduced the amount of money available for the facilitation of projects. Funding applications are often written with generic terminology that is more related to land based projects. "Therefore the marine environment is often bundled into 'Capacity building' and 'Community engagement' rather than assisting in the protection and conservation of biodiversity".

4.10 Summary

This chapter presented the results of questionnaires on marine education initiatives from the Commonwealth Government and two state governments. The results provided significant information on how governments, especially the Victorian and Tasmanian, are involved with marine education through their agencies, which is a prime objective of this study. Marine education initiatives from NGOs in Victoria and Tasmania are presented in the subsequent chapter.

Chapter 5

Marine Education Initiatives from Non-Governmental Organisations

5.1 Overview

In this chapter, marine education initiatives from the Tasmanian Marine and Coastal Community Network (MCCN), the Tasmanian National Parks Association (TNPA), the Tasmanian Conservation Trust (TCT), the Tasmanian Environment Centre (TEC), the Tasmanian Marine Teachers Association (TMTA), Hobart College, and Sea House World (Aquarium, a private business) are analysed. Except for WWF-Australia, most of the information was provided from Tasmania. This assessment is based on the survey results. The themes used for assessment include:

- existing marine education policies and strategies;
- the promotion of the value of MPAs;
- how are MPAs incorporated into current marine education (and community awareness) programs and which MPAs have been particularly used for educational purposes;
- marine education programs which are currently offered;
- marine education programs for promoting MPAs, and links between the programs and successful establishment of MPAs;
- resources and funding for implementing marine education; and
- major impediments to the implementation of marine education programs and raising awareness about MPAs.

The Gould League of Victoria, the Victorian National Parks Association (VNPA) and the Melbourne Aquarium did not complete the survey. The author was able to access information on these three organisations and the Dolphin Research Institute (DRI) from their respective publication lists and the internet.

5.2 NGO Marine Education Providers

The MCCN is a national, non-governmental project (sic) that encourages local community participation to conserve coastal and marine environments. The project is

funded by the Commonwealth Government's Natural Heritage Trust and most States have a regional co-ordinator. The Tasmanian MCCN works with government agencies, NGOs and local communities regarding marine environmental issues and public awareness of these issues (MCCN 2005). The information was provided by a Tasmanian MCCN Co-ordinator, Mr Bell.

The TCT was established as a voluntary organisation in 1968. They have been working to conserve the natural and cultural environment, especially in areas which strongly affect Tasmania. They are involved with issues of land use, forest, biodiversity, wildlife, freshwater and oceans and coasts. A majority of the staff are employed part-time and also numbers of volunteers support the organisation (TCT n.d.). This information was provided by Mr Bryan, a marine biologist and member of the TCT.

The TNPA was established in June 2001 as a non-profit and non-governmental organisation. The TNPA works for conservation of the natural environment within National Parks and encourages increased community involvement and awareness of parks and their value to the community (TNPA 2005). They focus more on the terrestrial environment than the marine environment. This information was provided by the President of the TNPA, Mr Campbell.

The TEC was formed in 1972 as a local, non-profit and non-governmental organisation. Through numbers of projects, the TEC works on sustainability and environment issues. They also contribute to environmental education and raising community awareness on these issues. The TEC plays an important role as an essential resource centre and provides information to the community in Tasmania (TEC 2003). The information was provided by Ms Steadman, an executive officer of the TEC.

The TMTA has representatives from around the state. Members include representatives from schools, the Woodbridge Marine Discovery Centre, and the Parks and Wildlife Service (Sugden, pers. comm., 2005). Hobart College is run by the State government of Tasmania and it provides education at years eleven and twelve, to both local and international students. The information was provided by Mr Sudgen, a representative of the TMTA and a teacher from Hobart College, and Ms Farley, also a teacher, from

Hobart College.

Seahorse World is one of the world's largest seahorse aquariums where more than 14,000 seahorses attract visitors and tourists. It is located at Beauty Point, 40 minutes drive from Launceston. An interpretation centre, a theatre, a touch pool and other facilities provide an informative and unique experience to visitors. While specializing in seahorses, this facility has provided the public with opportunities to learn more about the marine environment (Seahorse World n.d.). This information was provided from Ms Maynard, the aquarium manager.

WWF is one of the world's largest conservation organisations. Currently WWF-Australia focuses on the areas of oceans and coasts, forest, woodlands and grasslands, freshwater, threatened species and natural resources. The head office is located in Sydney and it has branches in all capital cities, except Hobart and Adelaide (WWF-Australia 2005). The information was provided from Mr Leck, the National Marine and Coastal Policy Officer in Queensland.

The VNPA was formed in 1952 for the purpose of protecting Victoria's biodiversity through the national park and reserve system (VNPA 2004). Although the prime focus is on the terrestrial environment, as mentioned in Chapter 2, the VNPA has played a critical role in establishing marine parks by leading the campaign. In order to achieve its goals, the VNPA has developed policies and many projects. The VNPA has developed educational resources such as information kits for schools.

The Gould League of Victoria has been a key environmental education organisation in Victoria since 1909. They deliver a range of programs from conservation to sustainable living. They include the marine environment in their programs which are designed for school students and also the wider community (Gould League of Victoria 2005).

The Dolphin Research Institute was established as a non-profit organisation in the late 1980s for conserving dolphins and the marine environment. The Institute has been working to deepen school students' understanding of the local marine ecosystem by providing schools with educational activities and resources. The Institute also sends

staff to schools to speak on marine related topics (Dolphin Research Institute n.d.).

The Melbourne Aquarium was established in 2000 and, since then, has been providing educational opportunities for local schools, the community and visitors. These are undertaken in partnerships with many private companies and government agencies such as Parks Victoria and Melbourne Water (Melbourne Aquarium 2005).

5.3 Marine Education Policies and Strategies

According to Mr Bell (pers. comm., 2005), MCCN "is not primarily an organization focused on marine education directed at schools, more for a general audience". However, occasionally the MCCN "has produced materials for schools, educational supplements (Newspaper in Education), posters, videos or stickers, most incorporate a biodiversity theme".

The TCT has no formal policies or strategies on marine education. Mr Bryan (pers. comm., 2005), a marine biologist, is a member of the TCT, but his primary work is not marine education. However, he makes use of opportunities to raise awareness and speak out about the importance of conservation. Therefore, whenever he visits schools or local community groups, he mentions Tasmania's marine environment. "During the last year I would have spoken at three community groups and to about 25 classes at primary and secondary schools. I am also a member of several fishery advisory committees (Tasmania) and two management advisory committees Australian Fisheries Management Authority (Commonwealth) and promote the value of MPAs in these forums whenever appropriate".

There are no specific marine education policies or strategies at the TEC either, but there is a wide range of resources related to marine and coastal issues in the Centre's Resource Library. Some publications are relevant to the marine environment and community use is encouraged. Publications include "Community Coastcare Handbook", "Afloat and Aware pamphlet", and "Minimal Impact Boating Strategy". The "Marine Debris Monitoring Teachers' Kit" includes a video and monitoring database pro-forma. In addition to those publications, teachers can borrow a "Coastcare education resource kit" for their marine educational activities at schools (Steadman, pers. comm., 2005).

According to Mr Campbell (pers. comm., 2005), the TNPA cannot get involved in many of issues and their prime focus is on terrestrial national parks due to the small size of the organisation. However, the TNPA has been supporting other organisations which have a particular focus on marine issues, such as MCCN. The TNPA has also run some campaigns which were related to MPAs and the marine environment including:

- written submissions in relation to the proposals for the Kent Group National Park (KGNP);
- promoted the values of the KGNP via articles appearing in the bi-annual TNPA Newsletter;
- invited Christian Bell, Tasmanian convener of the Marine and Coastal Community Network, to speak at the national film premier of the marine documentary "Deep Blue" (this was held in November 2004 at the Village Cinema complex in Hobart and attracted over 300 people);
- [a] letter to the Federal Minister for the Environment, Senator Campbell, requesting that ongoing shark fishing in the KGNP be banned; and
- a submission relating to the five year review of the Management Plan for the Tasmanian Wilderness World Heritage Area [which proposed] that the entry of large cruise ships be prohibited and boating and diving activities be regulated in the Port Davey-Bathurst Harbour region in order to protect the significant and unique community of marine invertebrates discovered in Bathurst Channel.

The TMTA aims to "provide support for marine education programs within all education sectors" (Sugden, pers. comm., 2005). "This support comes in the form of written material and 'clearing house' sessions as well as seminars and excursions". The values of MPAs are promoted by exemplifying the rich biodiversity and Maria Island Marine Reserve is used as a good example of a successful MPA. The values of using the MPAs are highlighted by 'hands on' or "real experiences".

The Seahorse World Mission Statement states that "Seahorse World Pty Ltd exists to provide a unique, high quality, educational tour experience for tourists, travellers and

special interest groups. In doing so Seahorse World Pty Ltd supports further research into the Syngnathid family of fishes". Their statement of values indicates that "at Seahorse World we believe in the sustainability of seahorses and the marine environment worldwide". At the aquarium, 13 guided tours are offered every day. Although "these guided tours are tailored to each group" basically the same educational messages are delivered. The aim of the aquarium is "to have visitors leave this attraction, having learnt about seahorses and the marine environment" (Maynard, pers. comm., 2005).

WWF-Australia's main objective is raising public awareness rather than school education. Mr Leck (pers. comm., 2005) stated that "[w]e also work with government agencies at policy and regulation level and with other stakeholders". Currently the following two themes are particularly targeted for their work, "sustainable fisheries and fishstocks", and "the World Summit on Sustainable Development goal" (10 per cent of world's ocean surface to be MPAs by 2012).

5.4 The Promotion of the Value of Marine Protected Areas

The majority of respondents pointed out that biodiversity conservation is a prime value of MPAs (Bell, pers. comm., 2005; Bryan, pers. comm., 2005; Sugden, pers. comm., 2005). In addition to biodiversity conservation, recreational, scientific (including fisheries management), educational (Bryan, pers. comm., 2005) and socio-economic values are promoted (Sugden, pers. comm., 2005). Mr Sugden also argued that the values promoted depend on the age of the students targeted.

With respect to MPAs which have been used for educational purposes, Mr Bell (pers. comm., 2005), Mr Bryan (pers. comm., 2005), and Mr Sugden (pers. comm., 2005) pointed out that Tinderbox Marine Reserve has been the most utilized site because of easy access. However, Mr Bryan argued that Tinderbox was at present not extensively used for educational purposes. As well as Tinderbox, Maria Island Marine Reserve was indicated as valuable educational MPA and it has been used by a number of school groups because of its safety, beauty and biodiversity (Bell, pers. comm., 2005; Farley, pers. comm., 2005; Sugden, pers. comm., 2005). Ms Maynard (pers. comm., 2005) stated that Governor Island Marine Reserve, near Bicheno on Tasmania's East Coast, is

the closest MPA to Seahorse World. Therefore, it is sometimes referred to during the guided tour, however, "if the Governor Island MPA or any other MPA is mentioned it would be in the context of its value as an excellent recreational diving site" and not really an educational value.

5.5 How Marine Protected Areas are Integrated into Marine Education

In Australia, the GBRMP is the best MPA, with excellent educational programs. As Mr Leck (pers. comm., 2005) from WWF-Australia indicated, the development of educational programs was encouraged by "a high tourist rate compared to other MPAs [which] leads to more opportunities to educate people". Therefore, the GBRMP is a prime example of a MPA which is integrated into marine education and the educational programs are offered not only locals but also tourists from overseas.

In Tasmania, the MCCN has been promoting the value of MPAs through most of their activities such as "special promotional functions, seminars and workshops, open days at marine reserves and even a marine reserve shop". Some speakers from overseas are also invited to speak at these events (Bell, pers. comm., 2005). Mr Bryan (pers. comm., 2005), at the TCT, commented that he used opportunities to speak at school or community activities about MPAs "as a tool to protect aspects of the marine environment". At the TEC, marine related topics are still minor issues. Ms Steadman (pers. comm., 2005) stated that "my sense is that MPAs are a minor theme in their own right".

However, teachers who provide marine education recognise the value of using MPAs in their educational activities. For example, Mr Sugden (pers. comm., 2005) commented that it was good to show the students the differences inside and outside of MPAs and to let them think about the roles that MPAs play in conserving the marine environment. "During workshops the values of MPAs are discussed and in the past when money was available, state wide promotion programs were run to highlight these values". Mr Sugden and Ms Farley stated that the Maria Island Marine Reserve has often been used for their educational activities, for all levels of students. "Teachers are encouraged to bring classes to the Maria Island MPA, so that students can gain a first hand experience of these areas. It gives the students a chance to visit relatively undisturbed marine

habitats and see, in the wild, organisms they would otherwise have no chance of experiencing. The reaction of students to this is very positive" (Sugden, pers. comm., 2005).

Seahorse World does not provide specific information about MPAs during their guided tours, but they are mentioned when they explain "pot bellied seahorses and occasionally weedy seadragons may be sighted in the Governor Island MPA" (Maynard, pers. comm., 2005). She commented that Governor Island is the nearest MPA, and provides easy access. However, she was "unaware of any specific marine education programs" at Governor Island.

5.6 Marine Education Programs Currently Offered

WWF-Australia works at policy and regulation level but they "do not offer marine education programs at this moment" (Leck, pers. comm., 2005). With regard to responses from Tasmanian NGOs, it has been found that almost none of them provide marine education programs due to their limited capacity. Mr Campbell (pers. comm., 2005) stated that "due to the small size of the Executive and the part-time basis of their involvement, the TNPA does not currently undertake any specific or ongoing marine education programs". Mr Sugden (pers. comm., 2005), TMTA, also commented that "we have no projects in place at the moment".

However, two respondents indicated past education programs. Mr Sugden (pers. comm., 2005) stated that "in 1997, a 'Marine Parks Poster Competition' was held for all grade eight students in Tasmania. A three day trip to Maria Island was organised for the 23 winners of the competition. This project was jointly organised by the PWS, DPIWE-Fisheries Management, Hobart College and MCCN to assist in raising awareness and acceptance of marine parks in Tasmania. The total cost of the project was $6710 including administration, transport and food. The cost includes those who were supervisors and older students who took care of young students". He also said that it was a very successful event. However, due to limited funding, it was difficult to make it a regular event.

According to Mr Bell (pers. comm., 2005), the Tasmanian MCCN also proposed some

education related projects in the past. "We did have some submitted in the last Envirofund round (started in 2002) but due to the emphasis of the Natural Heritage Trust on 'hands on' projects, environmental education projects finished well down the list of priorities to be funded. None were funded in Tasmania". Therefore, he considered that the only organisation in Tasmania that could submit marine education related projects would be the Woodbridge MDC. However, he also stated that "at present we have no individual projects proposed but will be considering some in light of the Bruny bioregion assessment process".

No further information was available from Seahorse World or other Victorian NGOs, however, Appendices 14 and 15 present marine education programs currently offered by the Gould League of Victoria and the Melbourne Aquarium. Appendix 16 also outlines marine education offered by the Dolphin Research Institute. The information was ascertained through their publications and the internet. The programs range from science to social studies and have been developed with consideration of the Essential Learning framework which is a core curriculum standard for schools in Victoria.

5.7 Marine Education Programs for Promoting Marine Protected Areas, and Links between the Programs and Successful Establishment of Marine Protected Areas

Three respondents indicated that marine education programs have been effectively delivered in the past. From Queensland, Mr Leck (pers. comm., 2005) suggested that 'the Reef Guardian School Project' was an successful program. "The issues treated are based on the GBR but it is not a pure education project but more focusing on giving kids responsibility for their actions and letting them think about the benefits from the ocean and stewardship".

From Tasmania, the following two comments are provided. "I ran a Natural Heritage Trust Education funded program in schools over three years [before Envirofund was launched] - that was very well received and promoted the natural values found in Tasmania's marine environment - including MPAs" (Bryan, pers. comm., 2005). "One of the best exercised and carried out, was the poster competition for all grade eight students in the state. Students were asked to research MPAs and design a poster highlighting the perceived values of MPAs" (Sugden, pers. comm., 2005). Mr Bell (pers.

comm., 2005) pointed out the difficulty of implementing awareness raising and other educational programs. "People are willing to support such reserves in principle but it becomes more difficult when actual site locations are proposed. The local community needs a lot more information to feel comfortable when a site is selected out". The last two MPAs which were established in 2004 were in remote areas. However, since the population of the Bruny bioregion is greater, more people are likely to be personally affected by the establishment of a MPA there. Therefore, he stated that much more public education is necessary especially for a new MPA proposal which will be in the Bruny bioregion.

With regard to links, all respondents suggested a positive relationship between education and public understanding of MPAs, although Mr Bryan (pers. comm., 2005) stated that "possibly but [there is] no evidence". Ms Maynard (pers. comm., 2005) from Seahorse World, commented that "the success of MPA establishment is dependant on a number of factors, better marine education would probably increase community support for MPAs". Mr Sugden (pers. comm., 2005) from the TMTA also recognised existing linkage. He stated that education is the only way to enhance community ownership of MPAs and increase support for their establishment and management. He illustrated his comments with successful examples of MPAs. "Within Australia, the Great Barrier Reef Marine Park is a classic example. Overseas examples where community awareness campaigns have lead to the successful development of MPAs include Goat Island in New Zealand, Apo Island in the Philippines (WWF project), Monado in Sulawasi (Indonesia), Malindi in Kenya [North of Kenya], the Andaman Islands off India, the Florida Keys (USA) and many other examples. All of these MPAs were successful because community ownership of the protected area was developed". Mr Leck (pers. comm., 2005) from WWF-Australia strongly supported the idea of links. "Education and high awareness contribute not only to support for establishing MPAs but also other marine related issues such as overfishing, land based pollution etc".

5.8 Resources and Funding for Marine Education Activities: Are they Sufficient?

Responses indicated that although Seahorse World and WWF-Australia have adequate funding, other local Tasmanian organisations have very limited or no resources with which to implement marine education. Ms Maynard (pers. comm., 2005) from Seahorse

World, said that there are "7.2 FTE staff (consisting of 11 full time and part time staff) and of these eleven staff, seven are involved in tour guiding". Two staff also undertake marine education activities at career expositions and at local schools. She considered that marine education had received adequate attention, however, more resources would enhance their capacity to provide more marine education programs. Funding from outside is also a possibility. Seahorse World has applied for Commonwealth Government funding in a "tourism development grant ($100,000), to build a laboratory and acquire equipment to enhance its marine education capacity".

WWF-Australia has a total of eight marine staff working at its branches in Australia. The WWF-Australia works on "marine species, policy, fisheries, Southern Ocean, tropical water and other variety of issues", therefore marine education is not a prime focus. Volunteers are not involved unless a large campaign or special events such as community stalls to introduce the work of WWF to the public and distribute pamphlets, are organised (Leck, pers. comm. 2005).

Mr Bell (pers. comm., 2005), from the Tasmanian MCCN, argued that it is hard to estimate resources because the number of activities very much depends on the time. Dozens of volunteers have been involved in some activities. In contrast, Mr Bryan (pers. comm., 2005) said that there are no staff to implement marine education at the TCT. Mr Sugden (pers. comm., 2005) also indicated that there is very limited support for activities of TMTA. He also pointed out that "even within Parks and Wildlife Service, there is no one specifically responsible for management, development or promotion of MPAs. This is particularly strange given the uniqueness and beauty of our marine environment and the level of degradation it has gone through".

The VNPA did not complete the survey, but the author was interested in how they have continued to lead a campaign for the establishment of a marine national park system for more than 20 years in Victoria. Therefore, the author asked Mr Smyth (pers. comm., 2005), a former staff member of VNPA to provide some information. His responses are as follows: "like any NGO, VNPA has to struggle with issues of capacity and funding. Prioritising is key to dealing with these, but also during my time at VNPA I was very lucky to have my position funded by a philanthropic benefactor. External funding like

this is crucial to many NGO campaigns. Volunteer support is too and we had many [volunteers] at VNPA and the smaller NGOs along the Victorian coast. Networking was critical". He also indicated that a cheap and very quick medium such as email facilitated their campaign and networking. VNPA also issues magazines and newsletters which are distributed to all members. These publications played an important role "to keep them [members] well informed at no cost to the campaign". Moreover, he pointed out there were cooperative relationships between NGOs and government agencies. During the campaign, the Victorian government and other organisations also provided assistance to VNPA. "The Department of Sustainability and Environment provided very good materials (colourful brochures, underwater videos) about the marine national parks that could be used by NGOs to support their case. This saved NGOs considerable resources which were able to be used for other aspects of the campaign. Excellent materials were also developed by the Marine and Coastal Community Network, again saving resources for VNPA". These comments provide some key lessons from which Tasmanian NGOs could learn.

5.9 Major Impediments to the Implementation of Marine Education Programs and Raising Awareness about Marine Protected Areas

Almost all Tasmanian NGOs which participated in the survey indicated a lack of resources as the main constraint to implementation of marine education programs and raising awareness (Bryan, pers. comm., 2005; Campbell, pers. comm., 2005; Farley, pers. comm., 2005). A very limited recognition of the importance of education and "no paid staff responsible for pushing the cause and attracting funding" hinder the implementation as well (Sugden, pers. comm., 2005). Additionally, Mr Bryan also stated that "many grant programs tend to exclude educational activities. It needs more financial support from the Government".

Mr Bell (pers. comm. 2005) commented on the level of support for MPAs from the Tasmanian Government:

> the Tasmanian MCCN has been the only organization that has consistently partaken in activities promoting MPAs over the last 13 years in Tasmania. The Tasmanian Government spends virtually nothing promoting MPAs. Apart from the production of the odd sign and the reissue of some brochures for some individual reserves, it would be generous to suggest they have spent anymore

> than three or four thousand dollars in the last ten years. The Tasmanian PWS web site does not even have a map of Port Davey MPA and makes no mention of the Macquarie Island MPA, despite the fact it has been in existence for nearly five years. The Tasmanian Government needs to develop a communication strategy for its existing reserves and fund the promotion of them to the tune of tens of thousands of dollars a year. [This] [s]eems, to the MCCN, a much better use of resources than spending three hundred thousand dollars to sink some old vessel off Maria Island (as a dive wreck) when it spends nothing on promoting Maria Island MPA for educational or tourism purposes. No NGO has the resources to promote MPAs to the level that is necessary, the government should be doing this as a core activity.

Mr Leck (pers. comm., 2005) from WWF-Australia, argued that the implementation of their marine related projects was hindered by the following issues. "Lack of awareness and lack of immediate impact on people's day to day lives. If marine issues are related to coral bleaching, land based pollution or decreased fish stocks, it might be not difficult for people to understand. However, if the issues are more complicated such as those related to high sea or political incentives, it would be difficult to get strong support from the community, even if it related to conservation issues".

5.10 Involvement of Friends Groups

This section introduces the activities of Friends groups working particularly for the marine environment in Victoria and Tasmania. Differing slightly from NGOs, Friends Groups consist entirely of volunteers who care about the local environment. According to Reef Watch (2005) and Parks Victoria (2005), there are at least four Friends groups in Victoria: the Friends of the Bluff (Barwon Bluff Marine Sanctuary), the Friends of Beware Reef Marine Sanctuary, the Friends of the Rickets Point Marine Care (Rickets Point Marine Sanctuary) and the Friends of Mud Islands. The Friends of the Bluff has an especially rich history and was formed in 1994 to:

- care for and maintain the remnant natural habitat of the Bluff;
- rehabilitate the population of the natural environment of the Bluff; and
- encourage community appreciation of the natural environment of the Bluff (Friends of the Bluff Inc. n.d.: n.p.).

As identified in previous chapters, the Barwon Bluff Marine Sanctuary has been extensively used for school and community marine education purposes for a number of years and educational use triggered the declaration of the site as a MPA. The Friends group has created more than 90 marine education programs based on their experience, in partnership with government agencies such as Parks Victoria and Coast Action/Coastcare. The Friends of the Bluff won a national "Banksia Award" for their dedicated work (Roberts, pers. comm., 2005) in 2005. Appendix 17 presents a select number of examples from each study area. Specific details are available on their web site (http://www.barwonbluff.com.au).

In Tasmania there is one Friends group called Friends of Maria Island Marine Protected Area (FOMMPA). It was formed in late 2005 and is still at a very early stage of development. The first activity will be application to the Envirofund for buoys to mark the MPA boundary, followed by other activities such as a clean up of the foreshore and underwater, reef watch monitoring, setting up an interpretive display and shore surveillance (Hrasky, pers. comm., 2005).

In contrast to Victoria, both the number and the experience of the Friends groups in Tasmania are few. However, the formation of FOMMPA is a good start to encourage community involvement and participation in the management of Tasmanian MPAs. As a new Friends group, it would be beneficial for them to learn from the experience of other Friends groups in Victoria.

5.11 Summary

This chapter presented questionnaire results on how Victorian and Tasmanian NGOs are involved with marine education and have raised public awareness of MPAs. As well as the promotion of the values of MPAs, marine education policies, programs, and resources were examined, followed by constraints on their implementation. One of the two main research aims of this study was to identify educational strategies and opportunities to promote MPAs in Tasmania and Victoria. This has been achieved in Chapters 4 and 5. The subsequent chapter will discuss the major findings of the research and discuss limitations.

Chapter 6

Discussion

6.1 Overview

This chapter discusses the key findings presented in the previous chapters, integrated with a literature review and the author's interpretation. In particular, the contrasts between Victoria and Tasmania are discussed, and the linkages between educational activities and the successful establishment of MPAs are examined to fulfil the second aim of this study.

6.2 Marine Education Policies and Strategies

It is vital for the future establishment of MPAs to have well-developed policies and strategies. Most government agencies and programs have policies and strategies for marine education and it has been taught by integrating with other subjects and areas of study, rather than having a specific framework for marine programs. One notable fact was that government agencies and programs in Victoria take consideration of MPAs in their policies and strategies. Whilst in Tasmania, policies and strategies are more generally concerned with marine and coastal issues. Regarding non-governmental organisations in Tasmania, there are no existing policies and strategies for marine education, except for the TMTA and Seahorse World.

6.3 Promoted Values of Marine Protected Areas

Almost all informants pointed out that biodiversity conservation was the most important and promoted value of MPAs. Although some respondents indicated that it was difficult to prioritise MPA values, the second most significant value pointed out was recreational use. This indicated that the majority of informants considered MPAs as suitable sites for leisure and enjoyment. However, the result was unexpected because conservation and recreational use of MPAs could be considered a contradiction because heavily utilised reefs can be damaged by users. The third MPA value identified in Victoria was the role of MPAs in the national park system. In contrast, the next most important value identified in Tasmania reflected the role of MPAs in fisheries management.

6.4 How Marine Protected Areas are Integrated into Marine Education

Although some marine education providers did not have specific MPA messages in their programs, the value of using MPAs for marine education was well recognised by education providers in both states. A number of respondents pointed out that hands-on activities were useful for deepening the knowledge of students. Whilst, regarding opportunities for provision of marine education, there were explicit differences between the two states. Educational programs offered by Victorian government agencies had a specific focus on marine education and MPAs. In contrast to Tasmania, there were limited educational programs relevant to MPAs offered by both the government agencies (except Fishcare) and NGOs. Although MPAs were presented in their talks at seminars, workshops and other events in Tasmania, no specific education programs relevant to MPAs were provided, except some limited brochures and guidebooks.

The following list presents MPAs that have been utilised for marine education targeting both school and the public in Victoria and Tasmania (MNP=Marine National Park, MS=Marine Sanctuary and MR=Marine Reserve).

Victoria

- Barwon Bluff MS
- Beware Reef MS
- Jawbone MS
- Maria Island MR
- Ricketts Point MS
- Point Addis MNP
- Port Phillip Heads MNP

Tasmania

- Ninepin Point MR
- Tinderbox MR Merri MS
- Mushroom Reef MS

As the list shows, Victorian MPAs used for marine education were located near large cities such as Melbourne and Geelong. This allows easy access for the community and more opportunities to use MPAs for educational purposes. In Tasmania, responses indicated that Maria Island has been most extensively used for school education because of the safety, beauty and biodiversity of the marine environment. This was followed by the Tinderbox MPA. Although three listed MPAs in Tasmania have been mainly utilised for educational purposes, they are all located in the southeast (Bruny bioregion) and on the east coast (Freycinet bioregion). Therefore, access is limited for those who live outside of those regions.

Whilst many respondents stated that accessibility was a key issue, some respondents indicated there were different factors, which made marine sites as MPAs. Even though the sites did not provide easy access to the public, dedicated community groups, volunteers and NGOs had undertaken some projects for conserving the marine life that resulted in raising community awareness on the local marine environment. These community activities contributed to enhancing the value of educational use and eventually the site was promoted as a MPA.

6.5 Marine Education Programs Currently Offered

Marine education programs currently offered both in Victoria and in Tasmania are provided in Appendices 4 to 17. In both states, the MDCs provide various marine education programs, based on curriculum framework in each state and emphasise hands-on activities for primary to tertiary students, covering science, arts and social topics. In addition to basic programs, the Queenscliff MDC offers programs for the Victorian Certificate of Education, work experience and professional development for school teachers. In Tasmania, staff from the Woodbridge MDC also visit other schools within the state. Both MDCs employ experts on marine education, therefore, by conducting classes at MDCs would reduce the burden of teachers and improve students' knowledge of marine related issues. As the Woodbridge MDC is run by the Tasmanian Department of Education, programs are mainly designed for school students. Although limited educational opportunities are available for the general public, the Woodbridge MDC contributes to raising public awareness by inviting parents to join their classes with children and providing educational opportunities such as open days and other

community events.

The difference in the programs offered by the two parks management bodies, Parks Victoria and the PWS in Tasmania, were obvious when compared to the education programs listed in Appendices 11 and 12, and other educational materials. Parks Victoria provides education programs for schools throughout the year and encourages Victorian schools to participate in these, which are based on the school curriculum. The themes vary from park regulations to endangered species and human impacts on the environment. In contrast, the Tasmanian PWS has not developed large numbers or such a variety of education programs. Regarding marine education, a jointly developed project on Macquarie Island by a local school and the PWS was the only one developed. Very limited marine education programs reveal that little effort and involvement has been made by the Tasmanian State Government in this area.

The Coastcare programs from both states do not provide regular school marine education programs. However, both Coastcare programs involve and assist a number of community activities and events relevant to marine and coastal environments, particularly in summer. Many programs include conservation and environmental awareness components. Although, Envirofund promotes hands-on activities, it limits funding for other educational programs and projects. Considering that most of their programs have been funded by the Commonwealth NHT, the funding restraints under which Envirofund operates limit and reduce educational opportunities.

Victorian Fishcare offered three educational programs and events for school students. As well as school programs, the Fishcare staff/volunteers also give talks to the broader community. Although no specific programs were identified for MPA education, at these talks MPA related issues are always mentioned in order to inform the public about newly established MPAs in Victoria. However, the number of programs offered by Victoria's Fishcare is limited by the availability of funds. The Tasmanian Fishcare program has currently developed a variety of projects and events for 2005-06, focussing on the areas of fisheries, aquaculture, marine and freshwater resources. Many of these include education components. However, no project looks specifically at marine reserves in Tasmania. Some programs have been tailored to education by collaboration

between government agencies and academic institutions. The programs are designed for school education and provided by trained Fishcare volunteers for increasing community and volunteer awareness, and producing and renewing brochures and posters. Therefore, comparing the two states' programs, Tasmania's Fishcare provides more education programs with greater variety. Nevertheless, MPA related issues are taken more into consideration in Victoria.

With respect to NGOs and other organisations in Victoria, there are at least four organisations that provide marine education to school students and community groups. In particular, the Gould League of Victoria has provided a range of programs for some years. Field experience is also included in their programs and some sites that have been extensively used in their activities have been promoted as MPAs, including Ricketts Point Marine Sanctuary. The Dolphin Research Institute also offers education programs and examines how projects have contributed to raising awareness of the local community. The Melbourne Aquarium also provides a variety of programs that allow the whole family to enjoy learning opportunities, as well as providing work experience for tertiary students. Moreover, the Friends of the Bluff have developed excellent marine education programs in partnership with Parks Victoria, and other organisations and individuals. More than 90 programs cover biology, marine environmental issues, geology, arts and social issues such as marine industries and media. The group encourages widespread use of their resources by making them available on the internet.

In contrast, there are currently no marine education programs provided by NGOs and other organisations in Tasmania, except for Seahorse World. Seahorse World offers tours to inform visitors about seahorses and the marine environment, including education and a conservation message.

Friends of Maria Island MPA (which was formed at the end of 2005) has not yet started any activities. Given the fact that the oldest Friends Group in Victoria, the Friends of the Bluff (Barwon Bluff Marine Sanctuary) was formed in 1994, Tasmania is more than 10 years behind the development of formalized approaches. Nevertheless, the establishment of the Friends of Maria Island MPA indicates an increasing of awareness for the marine environment and its formation is expected to support further recognition

for caring about coastal and marine environments in Tasmania.

6.6 Resources and Funding for Marine Education Activities: Are they Sufficient?

The majority of respondents pointed out that even when there are resources, they are not necessarily set aside for marine education or MPA related activities. Resources are used rather for general issues such as waste reduction, minimising impact on the marine environment, and underwater monitoring. Yet, even in these general areas, some respondents indicated that education and MPA related components might be included in these areas. Table 6.1 presents resources allocated for activities that include marine education in each organisation. Table 6.1 excludes NGOs in Tasmania since none of these has particular resources for marine education, except Seahorse World.

Table 6.1 Victorian and Tasmanian Resources and Funding for Activities which Include Marine Education

	Victoria	Tasmania
Coastcare	• Seven facilitators. • Over 100 volunteers around the state.	• All Coastcare type groups in Tasmania are involved in awareness raising activities but their focus is probably more coastal than marine (Southern Tasmania). • None (Cradle Coast Region).
Fishcare	• No paid staff at Fishcare Mornington Peninsula Group, but reporting to a part time facilitator at DPI. • 12 volunteers in the Group. • $3,000 annually from the TRAC. • Six Fishcare groups with 120 volunteers statewide.	• One FTE and two at 0.75 FTEs for volunteer program. • One FTE as a communication officer. • Approximately 80 volunteers in the State. • Core funding is from the DPIWE and supporting funds are sought from project applications.
Reef Watch (Victoria)	• Part-time (0.5) program coordinator. • 225 registered volunteers for survey of Reef Watch. • Melbourne Aquarium has supported two staff (eight hours per month) to assist seminars and workshops.	
Woodbridge MDC (Tasmania)	• Recurrent funding of $25,000 annually. • One FTE technician and skipper, part-time administration officer, aquarist and teacher. • Two volunteers per week (4 hours each) on average.	
Seahorse World (Tasmania)	• 7.2 FTE staff (consisting of eleven full time and part time staff) of these eleven staff seven are involved in tour guiding. Two staff also carry out marine education sessions at career expositions and at local schools.	

The Woodbridge MDC and Seahorse World suggested that more resources would be desirable for extending their activities. Fishcare (Mornington Peninsula Group in Victoria), Coastcare (Cradle Coast region in Tasmania), and the Woodbridge High School (Tasmania) responded that more support from governments is necessary to implement activities and raise local awareness on marine related issues throughout the state. In particular, insufficient resources limit Fishcare's activities in Victoria and even professional development of the staff. Southern Tasmanian Coastcare provided a different perspective, in that since the Envirofund started, limited funding has been available for educational projects. This issue was also highlighted by some NGOs in Tasmania. As a desirable extension of resources, "books for teachers specially targeted at MPAs" and having "visiting scientists" to the scientific programs were mentioned.

None of the NGOs in Tasmania has sufficient funds to contribute to marine education, which often needs long-term commitment. However, as pointed out by the VNPA, external funding, volunteer support, and government assistance made it possible for NGOs to carry out and continue MPA campaigns for a number of years in Victoria. In addition, networking has largely contributed to increasing this support beyond NGOs and the government.

6.7 Major Impediments to the Implementation of Marine Education Programs and Raising Awareness about MPAs

Most respondents who indicated inadequate resources and funding for marine education activities pointed out a lack of resources as a major constraint. In contrast, respondents who answered that resources have been sufficient, suggested that there have been no major impediments. However, some of them said that more funding would allow them to expand their educational activities. Fishcare in Victoria itemised its total support from the state government and found that an overlap of government agencies' responsibilities, a lack of business skills, and basic resources such as computers and other vital office equipment were major constraints. This response suggested that Victorian Fishcare was facing a very serious lack of resources. Other impediments such as a lack of funding for educational activities regarding Envirofund were pointed out by many informants of both government agencies and NGOs. Another notable fact regarding funding was as one respondent stated the Commonwealth provided very substantial funding annually to

the MCCN. However, the MCCN Victorian Office has been closed since July 2005 due to a lack of funds. This demonstrates a critical difference in recognition of the allocation of annual funds. A re-examination of funding allocation and its effectiveness is urgently recommended.

6.8 Marine Education Programs for Promoting Marine Protected Areas, and Links between the Programs and Successful Establishment of Marine Protected Areas

Many successful programs and activities were identified. These include travelling MPA road shows to schools, a poster competition for students, World Environmental Day for schools, underwater slide shows and movies, hands-on activities such as rock pool rambles and other field trips, and pamphlets and posters. Respondents indicated that there was a variety of effective methods to educate school students and the general public. In particular, showing the beauty and the uniqueness of the underwater world with slides and videos has also been used in the campaign for establishing a marine national park system in Victoria. Accordingly, this has been identified as a very effective approach for the wider public (Wescott 2005). In addition, many respondents suggested that marine education, particularly for school students can strengthen awareness and understanding of MPAs.

With respect to existing links, two Victorian respondents pointed out that it was too early to examine whether links exist between education programs and the successful establishment of MPAs. While there are a number of marine education programs offered, the Victorian MPA network was established in 2002. Therefore, not many studies have yet been undertaken to assess the linkage. In contrast, different perspectives on the links are also indicated by other respondents. The Ricketts Point Marine Sanctuary, east of Melbourne, was an example of a site that was promoted as a MPA because of extensive use by community groups. Their conservation activities, for many years, contributed to the designation of a marine sanctuary, by promoting awareness of the local marine environment. As another example, during the MPA establishment campaign, a newsletter and radio program established by the MCCN also contributed to encourage public involvement. This indicated that marine education and activities assisted in enhancing community awareness and recognition of the importance of conservation resulted in support for MPAs. Therefore, a link between marine education and the

establishment of MPAs could be arguable from pro and post declaration of MPAs.

With respect to Tasmania, the majority of responses also recognise the links that effective education can generate for support in establishing MPAs. However, as a respondent suggested, there is no explicit evidence to prove the links can be found in Tasmania. There are seven MPAs declared in Tasmania, however, not many educational activities to generate support for their establishment was undertaken. In addition, specific educational programs for a new MPA proposal have not yet been developed. Therefore, the links between marine education programs and successful establishment of MPAs is not shown in Tasmania.

6.9 Summary

This chapter discussed major findings of the research that was presented in Chapters 4 and 5. Results indicated that institutions and programs run or supported by governments, such as Coastcare, Fishcare, MDCs and Reef Watch have explicit policies and strategies. They are also funded sufficiently, for the programs they are currently undertaking, except for Fishcare in Victoria. Well structured marine education programs and activities, particularly for school students, were found at MDCs. Much wider-focused community programs were designed and offered by Coastcare, Fishcare, Reef Watch and aquariums in both states. There is a tendency for Victoria's marine education programs to take more notice of MPAs, as reflected by staff awareness. In Victoria, government staff awareness of MPAs is relatively high. Their job description covers wider issues and they promote and inform the community about MPAs as a part of their work. In contrast, the awareness by government staff of MPAs in Tasmania is lower, and MPA related issues are less considered as a part of their work.

With respect to NGOs in Tasmania, the majority of these do not have policies or strategies specifically for marine education. None of the NGOs currently provide marine education programs because of a lack of resources and funding. Considering the role played and the dedicated contribution over more than a decade by the VNPA to establish marine national parks, the lack of Tasmanian NGOs' capacity is critical because it reveals a lack of leadership which will impact on future promotion of MPAs from a non-governmental perspective.

Regarding MPAs that have been used for marine education, eight sites from Victoria and three sites from Tasmania were examined. The key reason was accessibility, followed by safety, rich biodiversity and beauty. With regard to marine education for promoting MPAs, the beauty and uniqueness of underwater environments, as well as hands-on and field activities have been emphasised. In particular, many respondents indicated that targeting young school students is relatively helpful. Although some respondents suggested a lack of explicit links, the majority of informants recognised that education is effective and a key tool to promote conservation awareness and MPAs.

Through Chapters 4 to 6, frameworks of educational opportunities to promote MPAs and key elements to identify potential MPAs for educational purpose in Tasmania were presented and analysed based on responses from informants. With this analysis, one of two aims of this study, as stated in Chapter 1, has been fulfilled. The subsequent chapter concludes this study and provides some recommendations for the future development of educational use of MPAs in Tasmania.

Chapter 7

Conclusions and Recommendations

The aim of this thesis was to review and assess marine education policies and programs in Tasmania and compare them with Victoria in order to assess factors that could enhance MPAs usage for education purposes. Additionally, the study examined links between marine education and its effectiveness in the successful establishment of MPAs. This was achieved by reviewing related literature and undertaking questionnaires. The questionnaires were completed by key informants involved in marine education and MPAs in Victoria and Tasmania. Two additional responses were collected from outside the two states. Relevant literature about MPAs and marine education were reviewed in Chapters 2 and 3, respectively. The results from the questionnaires were presented in Chapters 4 and 5, and discussed in Chapter 6. From the results and findings of the study, the following conclusions and recommendations can be drawn.

7.1 National Marine Education Program and the National Oceans Office

The development of a National Marine Education Program was one of the commitments of the Commonwealth Government in an initiative called *Ocean Rescue 2000* launched in 1991. The program has been developed mainly by the GBRMP Authority in Queensland, with the cooperation of other relevant institutions. The Authority recognised a commitment to education as the most important tool to conserve the marine environment. As a result, as well as education for the community and tourists, various education programs, especially for students, are developed and widely delivered by a web site entitled *reef ED* (http://www.reefed.edu.au). The GBRMP Authority encourages other education providers to use the programs.

Although the influence of their education programs was significant in the GBR region, according to this study, very little influence on Tasmania was identified. Moreover, the Commonwealth Government (2002b: 64) stated that "a draft education strategy has now been developed by the National Oceans Office... from this strategy, an Education Action Plan has been publicly released ..." However, the strategy and the action plan have not been released to the public at this stage. This has caused much confusion about the position of the Commonwealth Government with respect to its overall support for

marine education. The government's position and status, therefore, needs to be clarified. Furthermore, as stated in the questionnaires, there is a difference of understanding about resource allocation from the Commonwealth Government to the local Victorian MCCN.

7.2 Victoria

Marine education and the development of MPAs in Victoria were assessed as an example which could provide suggestions for the future development in Tasmania. Although Victoria struggled to obtain public support for the establishment of marine national parks, eventually 24 were declared in November 2002. The following critical lessons learnt can be drawn from its experience and are highly applicable to Tasmania. A strategic and tactical approach was firstly identified. This approach was persistent and the campaign for the establishment of the marine national park system continued for over 25 years. A clear education and communications strategy was employed. This allowed key messages to be delivered simply and precisely in order to be easily understandable for the general public. Finally an institutional framework for clear independent decision making was developed. This framework (LCC/ECC) assisted the decision making process of the government and was also supported by the public. Moreover, the existence of key NGOs played a major role in recognition of these three lessons. The VNPA has been a supporter of MPAs and marine education and their work since the late 1970s has been crucial.

Regarding marine education, Fishcare in Victoria has been struggling to implement their activities due to a lack of financial support from the government. There are a number of other well organised marine education programs provided by government agencies and NGOs at both school and community levels. They contribute to a relatively high awareness and understanding of the marine environment and its conservation in the state. The study also identified that close cooperative relationships exist between government agencies, NGOs and community groups. The network encourages and accelerates the development of education programs.

Although the VNPA maintains that there is still room to improve the marine national park system and community awareness, Victoria became one of the leading jurisdictions of MPAs and provides many lessons from which other jurisdictions can learn.

7.3 Tasmania

One of the primary aims of this study was to evaluate the current status of implementation of marine education in Tasmania. The significance of education for enhancing public awareness and their involvement in marine conservation has been widely recognised. However, very limited research has been undertaken and little information has been available for researchers on how much marine education at community and school levels has been implemented.

With respect to education providers, the Woodbridge MDC, Coastcare and Fishcare have been relatively well resourced and have provided a number of marine education programs. Education has been a core area of Fishcare's activities and recently numerous new projects relevant to education have been proposed. Although Coastcare focuses more on coastal issues and a limited focus has been provided for MPA issues, both the Woodbridge MDC and Coastcare also offer many education programs for students and community members.

Although there are some NGOs working on marine related issues, all of them pointed out that a lack of resources prevented their work from involving educational activities. The study also identified that there are no major NGOs in Tasmania which could lead an MPA campaign such as the VNPA in Victoria. This is a critical problem for future development of Tasmanian MPAs, especially from a community perspective. Not only is support lacking for future MPAs but even existing MPAs are insufficiently supported. For example, the Tinderbox Marine Reserve is the only MPA which has been managed primarily for educational purposes. However, the dive trails which are the main educational features have not been maintained or serviced for two years due to a lack of funding.

The Tasmanian State Government released its new policy on establishing MPAs in the Bruny bioregion based on the RPDC (MCCN 2006b). Although no major education program has been launched for enhancing the local community's understanding on the new proposal, the MCCN Tasmania is in the process of considering some projects which may include educational issues for new MPAs.

7.4 Recommendations for Candidates of the Educational Use of MPAs and Improvement of Existing Marine Protected Areas in Tasmania

Another aim of the study was to clarify and reinforce the identification and selection criteria of MPAs for educational purposes. No details regarding the criteria for the establishment of educational use MPAs have been provided in either the Tasmanian MPA strategy (DPIWE 2001) or the ANZECC guidelines (ANZECC 1999). However, through this research, three major factors were identified which make an MPA suitable for education: easy accessibility to cities or towns; marine habitat such as rock pools; and a site which is close to marine related institutions such as the Woodbridge MDC.

Considering the results of this research, Table 7.1 presents recommended sites for the establishment of MPAs, especially for educational purposes at school and community levels in Tasmania. This was made by assessing the recommendations of educationally applicable MPA candidate sites, which were proposed by the MRSC in 1996. The recommendations were re-examined using factors for educational use.

Table 7.1 Recommended Sites as MPAs for Educational Purposes

High Priority	
Name of MPA	Location in Tasmania
Freycinet	East Coast
Pirates Bay to Fortescue Bay	East Coast
Port Arthur	East Coast
Rocky Cape	North Coast
Low Head to Five Mile Bluff	North Coast
Badger Head	North Coast
Middle/Low Priority	
Binalong Bay	East Coast
Moulting Lagoon	East Coast
Waubs Bay	East Coast
Mayfield Point	East Coast
Waterhouse Island	North Coast
Arthur River to Temma	West Coast
Coast Adjacent to Strzelecki National Park	Flinders Island
Sea Elephant Bay	King Island

Six sites on the east and north coast have been identified as especially beneficial for educational purposes. Three national parks on the east and southeast coast receive large numbers of visitors including school students each year. These national parks would provide unique opportunities to promote marine education if the terrestrial national park boundaries were extended seaward. The Freycinet National Park, which receives about 200,000 visitors annually, is an exceptional location for marine education and MPAs with high visitor numbers, and easily accessible to the coastal and marine environment. Pirates Bay to Fortescue Bay Area is located offshore of the Tasman National Park and receives 180,000 to 190,000 visitors annually. Port Arthur, located near the Tasman National Park, is one of major tourist icons for Tasmania and could provide exceptional marine educational benefits.

Rocky Cape on the north coast is one of highly recommended marine sites because of its distinguished marine biodiversity. The Rocky Cape National Park is easily accessible and this could contribute to the enhancement of marine educational opportunities. Low Head to Five Mile Bluff is located near the Tamar River estuary and is close to Beauty Point where Seahorse World is located. The existence of marine related institutions can be an important factor to promote the site as an MPA for educational purposes. Finally, Badger Head is located at the Narawantapu National Park on the Bass Strait. Therefore, the site could provide educational opportunities to the wider public.

The other eight sites were also recommended by the MRSC as MPA candidates, which include educational use. However, these sites were not considered highly appropriate because of their close proximity to a large population, marine habitat or marine related institutions. These sites were considered to have either a middle or low priority to be developed as an MPA for educational purposes.

In addition to the recommendations of the MRSC in 1996, the following recommendations for the establishment and improvement of MPAs were made.

- designation of a MPA at Woodbridge MDC;
- increased marine educational activities and resources given the number of school groups that visit the Maria Island National Park; and
- improvement of basic interpretative materials such as the underwater dive trail at the Tinderbox Marine Reserve.

The establishment of a MPA for educational purposes in Peppermint Bay near Woodbridge MDC was recommended by Edger in 1981. The proposal was withdrawn due to strong opposition from local fisheries groups. However, considering the high usage of the site by students who study at the Woodbridge MDC, there would be considerable benefit to designate the site as a MPA. Furthermore, it has been 25 years since the withdrawal of the proposal. It would now be an ideal time to re-examine its potential as a MPA supporting marine education. Maria Island and Tinderbox MPAs have been used for educational purposes in Tasmania. Yet, at both sites, limited educational opportunities have been provided by DPIWE and the PWS. Considering

current management of the two marine reserves, more resources should be allocated to enhance the benefits of marine educational opportunities. The Tinderbox marine reserve has been managed primary for educational purposes yet no maintenance on the dive trails has been forthcoming. This reveals a lack of awareness of the educational benefits which these MPAs can provide. DPIWE and the PWS need to recognise the importance of marine education and fund opportunities accordingly.

Overall, this study identified limited policies and programs developed for marine education, as well as a lack of recognition of the significance of MPAs in providing these educational opportunities in Tasmania. Although the establishment of MPAs must be considered in reference to broader factors and context, it is important to understand that marine education can contribute to increasing the awareness of overall conservation of the marine environment including MPAs. Therefore, Tasmania should recognise Victoria as an important model in promoting marine educational opportunities that contribute directly to the establishment of MPAs.

References

Anon, n.d. *Ocean Rescue 2000*, http://www.ciesin.org/kiosk/ebs/Declarations/EBGCD-0002.txt, accessed 6 June 2005.

Australian and New Zealand Environment and Conservation Council (cited as ANZECC), 1998, *Strategic Plan of Action for the National Representative System of Marine Protected Areas* (Draft for public comment), Canberra, Australia.

Australian and New Zealand Environment and Conservation Council (cited as ANZECC), 1999, *Strategic Plan of Action for the National Representative System of Marine Protected Areas: A Guide for Action by Australian Governments*, Canberra, Australia. pp 51, 54, 55.

Australian Marine Conservation Society (cited as AMCS), 2005, *Conservationists Challenge Environment Minister over Marine Protected Areas* (Media Release), http://www.amcs.org.au/learn/media/media051201.html accessed 2 January 2006.

Babbie, E. 2002, *The Basics of Social Research*, Wadsworth Thompson Learning, Belmont, California, USA. p 56.

Bailey, K.D. 1982, *Methods of Social Research* (Second edition), The Free Press, A Division of Macmillan Publishing Co., Inc. New York, USA.

Baker, R. and Dubecki, L. 2001, Marine National Parks Back on Agenda, In, *Victoria's Marine National Park Debate – Select Articles*, Allen, T (ed). Victoria, Australia.

Ballantine, B. 1997, *Education in "No – Take" Marine Reserves*, presented at MESA Conference, 1997.

Ballantyne, R.R. and Uzzell, D.L. 1994, A Checklist for the Critical Evaluation of Informal Environmental Learning Experience, *International Journal of Environmental Education and Information*, Vol.13, No.2 pp 111-124.

Barrett, N. and Edgar, G. 1993, *A Survey of Potential Marine Reserve Locations in Bass Strait*, Final Report Ocean Rescue 2000, Project D701 for Australian National Parks and Wildlife Service. DPIF Technical Report, Australia.

Barrett, N., Wilcox, S. and Tasmanian Aquaculture and Fisheries Institute. 2001, *Biological Surveys and Habitat Mapping of Proposed Marine Protected Areas on the Tasmanian North and North-eastern Coasts*. Technical Report Series, No.6, Hobart, Australia.

Baxter, J. and Eyles, J. 1999, The Utility of in Depth Interviews for Studying the Meaning of Environmental Risk, *The Professional Geographer*, American Society for Professional Geographers and Association of American Geographers (ed), Vol.51, No.2, pp 320-370.

Blayney, C. and Wescott, G. 2004, Protecting Marine Parks in Reality: The Role of Regional and Local

Communication Programs, *Australian Journal of Environmental Management*, Anderson, E., Dovers, S., Hogg, D., and Odgers, B. (eds). Melbourne, Australia. Vol. 11, No. 2, p 126.

Bradshaw, M. and Stratford, E. 2002, Qualitative Research Design and Rigour, *Qualitative Research Methods in Human Geography*, Hay, I. (ed), Oxford University Press, Melbourne, Australia.

Cicin-Sain, B. and Belfiore, S. 2003, *Linking Marine Protected Areas to Integrated Coastal and Ocean Management: A Review of Theory and Practice*, Discussion Paper for the World Parks Congress held in Durban, South Africa, September 8-17, 2003.

Creswell, J.W. 1994, *Research Design: Qualitative and Quantitative Approaches.* California: Sage Publications, USA.

Cresswell, I.D. and Thomas, G.M. 1997, *Terrestrial and Marine Protected Areas in Australia,* http://www.deh.gov.au/parks/nrs/capad/1997/paaust/prelims.html, accessed 17 August 2005.

Davis, J.B., Fluharty, D., Christie, P., and Murray, M. 2003, Balancing Ecology and Economics, Part II: Lessons Learned from Planning an MPA Network in Victoria, Australia, *MPA News*, Davis, J.B., Fluharty, D., Christie, P., and Murray, M. (eds), Vol. 4, No.7, February, http://depts.washington.edu/mpanews/MPA38.pdf, accessed 25 May 2005.

Department of Agriculture Fisheries and Forestry (Commonwealth Government of Australia), n.d.b *The National Recreational Fishing Policy,* http://www.affa.gov.au/corporate_docs/publications/word/fisheries/nat_recfishing_policy.doc, accessed 5 October 2005.

Departments of Agriculture, Fisheries and Forestry and the Environment and Heritage (Commonwealth Government of Australia), 2004, *Natural Heritage Trust Programs*, http://www.nht.gov.au/programs/index.html, accessed 14 May 2005.

Department of Education (Tasmanian State Government), 2003, *Essential Learning*, Hobart, Tasmania.

Department of Education and Training (Victorian State Government), 2005, *School Education,* http://www.det.vic.gov.au/det/schooled/default.htm, accessed September 27 2005.

Department of Primary Industries, Water and Environment (Tasmanian State Government) cited as DPIWE, 2000, *Tasmanian Marine Protected Areas Strategy: Background Report,* DPIWE Hobart, Tasmania.

Department of Primary Industries, Water and Environment (Tasmanian State Government) cited as DPIWE, 2001, *Tasmanian Marine Protected Areas Strategy*, DPIWE Hobart, Tasmania. p 20.

Department of Primary Industries, Water and Environment (Tasmanian State Government) cited as DPIWE, 2002, *Tasmania Visitors Map*, Tasmap publication, Hobart, Australia.

Department of Primary Industries, Water and Environment (Tasmanian State Government) cited as

DPIWE, 2005, *Coastcare* http://www.dpiwe.tas.gov.au/inter.nsf/WebPages/JPHS-5T68MN?open, accessed 28 September 2005.

Department of Sustainability and Environment (Victorian State Government), cited as DSE, n.d. *Fishcare Volunteer*, Brochure.

Department of the Environment and Heritage (Commonwealth Government of Australia), 2002, *Australia's Oceans Policy*, http://www.deh.gov.au/commitments/wssd/publications/oceans.html, accessed 13 June 2005.

Department of the Environment and Heritage (Commonwealth Government of Australia), 2003, *Australia's South-east Marine Region: A User's Guide to Identifying Candidate Areas for a Regional Representative System of Marine Protected Areas*, http://www.deh.gov.au/coasts/mpa/commonwealth/identifying/parta.html, accessed 17 August 2005.

Department of the Environment and Heritage (Commonwealth Government of Australia), 2004, *Marine Protected Areas*, http://www.deh.gov.au/coasts/mpa/about/australian.html, accessed 17 August 2005.

Department of the Environment and Heritage (Commonwealth Government of Australia), 2005a, *Coasts and Oceans*, http://www.deh.gov.au/coasts/index.html, accessed 18 May 2005.

Department of the Environment and Heritage (Commonwealth Government of Australia), 2005b, *Representative Marine Protected Areas in Australia's South-east Marine Region,* http://www.deh.gov.au/coasts/mpa/southeast/index.html accessed 20 December 2005.

Dolphin Research Institute, n.d, *Dolphin Education Projects*, http://www.dolphinresearch.org.au/dolphin_education_project.htm, accessed 24 July 2005.

Dowling, R. 2000, Power, Subjectivity and Ethics in Qualitative Research, *Qualitative Research Methods in Human Geography*, Hay, I. (ed), Oxford University Press, Melbourne, Australia.

Dropkin, L. 2000, Communications and MPAs: How Practitioners Are Raising Awareness of MPA Issues. *MPA News*, Davis, J.B., Fluharty, D., Christie, P., and Murray, M. (eds), Vol. 2, No. 4, http://depts.washington.edu/mpanews/MPA13.htm, accessed 13 May 2005.

EA (Commonwealth Government of Australia) cited as EA, 1997, *Coastal and Marine Resource Guide: A Component of the Coastal and Marine Schools Project*, Compiled by MESA, Macquarie University and AAEE. Environment Australia, Canberra, Australia.

EA and Department of Agriculture, Fisheries and Forestry (Commonwealth

Government of Australia,), 2000, *Mid Term Review of the Natural Heritage Trust*, The Response, http://www.nht.gov.au/review/pubs/mtrbrf1sept.pdf, accessed 4 July 2005.

Edgar, G. 1981, *An Initial Survey of Potential Marine Reserves in Tasmania*, National Parks and Wildlife Service Occasional Paper No.4, Tasmania, Australia.

Edgar, G. 1984, *Marine Life and Potential Marine Reserves in Tasmania* Part 2, Parks and Wildlife Service Occasional Paper No.7. Tasmania, Australia.

Edgar, G.J., Moverley, J., Peters, D. and Reed, C. 1995, *Regional Classification of Tasmanian Coastal Waters and Preliminary Identification of Representative Marine Protected Area Sites*, Project No. D705, Tasmania, Australia. pp 46, 47.

Edyvane, K. 2002, Looking Offshore – Our Coastal Waters: Tasmania's Coastal Marine Bioregions, In, *Putting a Toe in the Water: Getting Started with Coastal and Marine Studies in Tasmania, A Teachers' Guide*. Stadler, T. and Thorp, V. 2002, University of Tasmania, Hobart, Australia.

Edyvane, K. 2005, *Marine Protected Area Planning and Management*, Powerpoint slides.

Edyvane, K. and Lockwood, M. 2005, Marine Protected Areas, In, Worboys, G.L., Lockwood, M. and De Lacy, T (eds), *Protected Area Management* (Second edition), Oxford University Press, South Melbourne, Australia. Pp532-552.

Environment Conservation Council (cited as ECC), 2001, *Marine, Coastal and Estuarine Investigation* (Final Report), East Melbourne, Australia.

Evans, D. and Gruba, P. 2002, How to Write a Better Thesis (2nd ed.), Melbourne University Press, Carlton South, Victoria, Australia.

Finn, M., Elliot-White, M. and Walton, M. 2000, *Tourism and Leisure Research Methods, Data Collection, Analysis and Interpretation*, Longman, Essex, United Kingdom.

Friends of the Bluff Inc.n.d., Friends of the Bluff, http://www.barwonbluff.com.au/partnerships/friendsofbluff/frends_bluff.htm, accessed 16 October 2005.

Fyfe, M. 2002, A World-First as State Sanctuaries of the Deep Open, *Victoria's Marine National Park Debate- Select Articles* (The Age Newspaper), Victoria, Australia.

Garrett, P. 2002, Opinion – Our Politicians All at Sea, *Victoria's Marine National Park Debate – Select Articles*, (The Age Newspaper),Victoria, Australia.

Gartrell, G. 2002, *Marine Reserves and Biodiversity Conservation: Election Policy Program of the Tasmanian Greens*, http://tas.greens.org.au/policy/PDF/MARINE%20RESERVES%202002.pdf, accessed 24 July 2005.

Gould League of Victoria, 2005, *Marine Programs*, http://www.gould.edu.au/article.asp?id=8755, accessed 14 April 2005.

Graham, R. Ewert, L, and Davis, S. 1985, A Perspective on Pre-University and College Marine and Aquatic Education in Canada, In, *Marine Parks and Conservation Challenge and Promise*, Lien, J and Graham, R (eds), Vol 1, Henderson Park Book Series, No.10. The National and Provincial Parks Association of Canada. Mri Printing Service, St. John's, Canada. p 172.

Great Barrier Reef Marine Park Authority (cited as GBRMPA), n.d. a Reef Guardian Schools... Protecting Our Great Barrier Reef, Brochure.

Great Barrier Reef Marine Park Authority (cited as GBRMPA), 2006a, What makes the Reef Special? http://www.tourismoperators.reefhq.com.au/marinepark/special/index.html, accessed 6 February 2006.

Great Barrier Reef Marine Park Authority (cited as GBRMPA), 2006b, Reef HQ, http://www.reefhq.com.au/, accessed 6 February 2006.

Griffith University and the Department of the Environment, Sport and Territories (cited as Griffith University and DEST), 1997, *Coastal and Marine Studies in Australia: a Workshop Manual for Teachers*. http://www.deh.gov.au/education/publications/cms/rationale.html, accessed 14 September 2005.

IMCRA Technical Group, 1997, *Interim Marine and Coastal Regionalisation for Australia: An Ecosystem Based Classification for Marine and Coastal Environments*, Version 3.2, Environment Australia, Canberra, Australia.

IUCN-WCPA, 1994, *Guidelines for Protected Area Management Categories* http://iucn.org/dbtw-wpd/edocs/1994-007-En.pdf accessed 25 August 2005.

Kelleher, G., Bleakley, C., and Walls, K. 1995, Marine Region 18: Australia/New Zealand, In, *A Global Representative System of Marine Protected Areas: South Pacific, Northeast Pacific, Northwest Pacific, Southeast Pacific and Australia/New Zealand*, Great Barrier Reef Marine Park Authority, The World Bank and The World Conservation Union (IUCN) (eds), The World Bank, Washington, D.C. USA, Vol. IV, pp153-166.

Kelleher, G. and Kenchington, R. 1991, *Guidelines for Establishing Marine Protected Areas.* A Marine Conservation and Development Report, IUCN, Gland, Switzerland.

Kenchington, R. Ward, T. and Hegerl, E. 2003, *The Benefits of Marine Protected Areas*, http://www.deh.gov.au/coasts/mpa/wpc/pubs/benefits-mpas-technical.pdf, accessed 12 May 2005.

Kriwoken, L.K. 1993, Islands of Management in a Sea of Mismanagement: Marine Reserves in Tasmania,

In, *Protection of Marine and Estuarine Areas – A Challenge for Australians*, Ivanovici, A., Tarte, D. and Olson, M. (eds), Proceedings of the Fourth Fenner Conference on the Environment, Canberra, 9 – 11 October 1991. pp 67-92.

Kriwoken, L.K. 1996, Australian Biodiversity and Marine Protected Areas. *Ocean and Coastal Management*, Vol.33, pp 113-132.

Kriwoken, L.K. and Anutha, K. 1993, Coastal Zone Initiatives, In, *The Tasmanian Parliamentary Accord and Public Policy 1989-1992: Accommodating the New Politics?* Haward, M (ed), Canberra, Federalism Research Centre, Australian National University, pp 169-180.

Kriwoken, L.K. and Haward, M. 1991, Marine and Estuarine Protected Areas in Tasmania, Australia: The Complexities of Policy Development, *Ocean and Shoreline Management*. pp 143-163.

Laws, K. 1989, Learning Geography through Fieldwork, In, Fien, J. Gerber, R. and Wilson, P. (eds), *The Geography Teacher's Guide to the Classroom*, (Second edition), Macmillan Melbourne, Australia, p106.

Leaman, J. 2004, *Community/Stakeholder Views of the Port Davey/Buthurst Harbour Marine Protected Area*, Published Honours Thesis. School of Geography and Environmental Studies, University of Tasmania, Sandy Bay, Australia.

Leonard, G. 2001, Leading Scientists Say Fully Protected Marine Reserves Produce Enormous Benefits, *Waves*, Autumn, Vol 8, No.1.

Marine and Coastal Community Network (cited as MCCN), 2001, Marine Protection Plan for Macquarie Island Marine Park. *Waves*, Autumn, Vol 8, No.1.

Marine and Coastal Community Network (cited as MCCN), 2005, *Waves,* Winter, Vol 11, No. 1.

Marine and Coastal Community Network (cited as MCCN), 2006a, MCCN's Victorian E-Bulletin January 2006, http://www.mccn.org.au/state_bulletins.php, accessed 25 January 2006.

Marine and Coastal Community Network (cited as MCCN), 2006b, Wetstuff News, 18. January. 2006, http://www.mccn.org.au/article.php/id/945/ accessed 18 January 2006.

Marine Education Society of Australasia Inc (cited as MESA), 2005, *Reef Guardian Schools*, http://www.mesa.edu.au/friends/sponsors/gbrmpa02.asp, accessed 26 September, 2005.

Marine Reserves Steering Committee (cited as MRSC), 1996, *Marine Protected Areas Workshop: Workshop Summary*, Bronte Park, Tasmania, 7 – 8 December 1996, Tasmania, Australia. pp 23-24.

Mayer, V.J. and Forter, R.W. 1985, Marine and Aquatic Education, In, *Marine Parks and Conservation Challenge and Promise*, Lien, J and Graham, R (eds), Vol 1, Henderson Park Book Series,

No.10. The National and Provincial Parks Association of Canada. Mri Printing Service, St. John's, Canada. p 164.

Melbourne Aquarium, 2005, *Underwater Zoo*, http://www.melbourneaquarium.com.au/education/index.asp, accessed 23 July 2005.

Miller, C. 2002, Hidden Treasures, In, *Victoria's Marine National Park Debate – Select Articles*, Allen, T (ed). Victoria, Australia.

National Oceans Office (Commonwealth Government of Australia), 2002, *Communities: Connecting with the Ocean, The South-east Regional Marine Plan, Assessment Reports*, Hobart, Australia. p 64.

Neuman, W.L. 1994, Social Research Methods: Qualitative and Quantitative Approaches, Massachusetts, USA.

Neuman, W.L. 2004, *Basics of Social Research: Qualitative and Quantitative Approaches*, Pearson Education, Inc. Boston, USA.

Oliver, J. 1997, *Best Practice in Marine and Coastal Field Work*, http://www.deh.gov.au/coasts/publications/series/pubs/best.pdf, accessed 18 August 2005.

Parks and Wildlife Service (Department of Tourism, Parks, Heritage and the Arts, Tasmanian State Government), 2004, *New Marine Reserves: Port Davey and the Kent Group*, Parks and Wildlife Service Tasmania, Hobart, Australia.

Parks and Wildlife Service (Department of Tourism, Parks, Heritage and the Arts, Tasmanian State Government) cited as PWS, 2005a, *Education*, http://www.parks.tas.gov.au/education/education.html, accessed 17 June 2005.

Parks and Wildlife Service (Department of Tourism, Parks, Heritage and the Arts, Tasmanian State Government) cited as PWS, 2005b, *Visitor's Guide to Tasmania's Marine Reserves*, http://www.parks.tas.gov.au/marine/, accessed 1 December 2005.

Parks and Wildlife Service (Department of Tourism, Parks, Heritage and the Arts, Tasmanian State Government) cited as PWS, 2005c, *Visitor Statistics - Parks 1970/71 - 2004/05*, http://www.parks.tas.gov.au/manage/statistics/visitorstats_parks/index.html, accessed 16 February 2006.

Parks Victoria (Department of Sustainability and Environment, Victorian State Government), 2003a, *Parks Victoria Manage Victoria's Marine National Parks and Marine Sanctuaries*, http://www.barwonbluff.com.au/parks_victoria/Parks%20Victoria%20Manage%20MNPs.pdf, accessed 25 June 2005.

Parks Victoria (Department of Sustainability and Environment, Victorian State Government), 2003b,

Victoria's System of Marine National Parks and Marine Sanctuaries: Management Strategy 2003-2010, Parks Victoria, Melbourne, Australia.

Parks Victoria (Department of Sustainability and Environment, Victorian State Government), 2003c, *Parks Victoria Education Resources – Marine*, Parks Victoria, Melbourne, Australia

Parks Victoria (Department of Sustainability and Environment, Victorian State Government), 2005, *Parks and Reserves*, http://www.parkweb.vic.gov.au/, accessed 30 May 2005.

Parvey, C. 1997, *Ocean Rescue 2000* (OR2000): A National Representative System of Marine Protected Areas for Australia, Commonwealth Technical Consortium Regionalisation Products (Component 2), http://www.deh.gov.au/coasts/mpa/nrsmpa/or2000/, accessed 27 September 2005.

Patton, M.Q. 2002, *Qualitative Research and Evaluation Methods*, Sage Publications, California, USA.

Pomeroy, R.S., Parks, J.E. and Watson, L. 2004. *How is your MPA doing? A guidebook of natural and social indicators for evaluating Marine Protected Area management effectiveness.* IUCN, Gland, Switzerland and Cambridge, UK.

Queenscliff Marine Discovery Centre (Victorian State Government) cited as Queenscliff MDC, 2004, About the Centre, *http://www.dpi.vic.gov.au/dpi/nrenfaq.nsf/childdocs/-65A2C6132A703367CA256C6F001CB4C6-4906056C432FEDB1CA256C6F001B0D1D-03EA05C605CA2A744A25685D00236C5C?opens, accessed 23 April 2005.*

Reef Watch, 2005, The Great Victorian Fish Count, http://www.reefwatchvic.asn.au/GVFC.htm, accessed 22 November 2005.

Resource Planning and Development Commission (cited as RPDC), 1997, *Tasmania: State of the Environment 1997,* Vol 2, RPDC, Hobart, Tasmania.

Resource Planning and Development Commission (cited as RPDC), 2003, *Inquiry into the Establishment of Marine Protected Areas within the Davey and Twofold Shelf Bioregions: Final Recommendations Report.* RPDC, Hobart, Australia.

Robinson, A.H. 1976, Recreation, Interpretation and Environmental Education in Marine Parks: Concepts, Planning, Techniques and Future Directions (Session 5, Working Paper No.4), *An International Conference on Marine Parks and Reserves: Papers and Proceedings*, Tokyo, Japan, 12-14 May 1975, IUCN (ed), Morges, Switzerland.

Rodrigue, M. 2004, *Connecting the Coast and Communities: Community Engagement with Victoria's Marine National Park System.* (Delivered at the Coast to Coast Conference, Hobart, Tasmania, April 2004).

Rolland, T. (in Fyfe, M.) 2002, A World-First as State Sanctuaries of the Deep Open, In, *Victoria's Marine National Park Debate- Select Articles* (The Age Newspaper), Allen, T., (compiled), Victoria, Australia.

Sahertian, I.H. 2002, *The Role of Marine Discovery Centres in Supporting Environmental Education, Case Study: Woodbridge Marine Discovery Centre, Tasmania.* Unpublished Masters Thesis, School of Geography and Environmental Studies, University of Tasmania, Australia.

Secretariat of the Convention on Biological Diversity (cited as CBD), 2004, *Technical Advice on the Establishment and* Management of a National System of Marine and Coastal Protected Areas, CBD Technical Series, No.13, Montreal, Canada.

Seahorse World, n.d., *Seahorse World*, Brochure.

Smyth, C. Prideaux, M. Davey, K. and Grady, M. 2003, *Oceans Eleven: The Implementation of Australia's Oceans Policy and Ecosystem-Based Regional Marine Planning*, Australian Conservation Foundation, Carlton, Australia. p 33.

Stadler, T. and Thorp, V. 2002, *Putting a Toe in the Water: Getting Started with Coastal and Marine Studies in Tasmania, A Teachers' Guide.* University of Tasmania, Hobart, Australia.

Stump, N. 2002, *Marine Protected Areas in Tasmania: A Commercial Fisheries Perspective*, Unpublished Honours Thesis, School of Geography and Environmental Studies, University of Tasmania, Australia.

Tasmanian Conservation Trust (cited as TCT), n.d., *Tasmanian Conservation Trust Home Page*, http://www.tct.org.au/home2.htm#Tasmanian, accessed 17 November 2005.

Tasmanian Environment Centre (cited as TEC), 2003, *About Us*, http://www.tasmanianenvironmentcentre.org.au/other/about.htm, accessed 19 November 2005.

Tasmania National Parks Association (cited as TNPA), 2005, *About Us*, http://www.tnpa.asn.au/about.html, accessed 19 November 2005.

Traill, B. and Porter, C. 2001. In, *The Long and Winding Road: the Development of a Comprehensive, Adequate and Representative System of Highly Protected Marine Protected Areas in Victoria.* Wescott, G. 2005, (in preparation), Victoria, Australia.

Victorian Environmental Assessment Council (VEAC), 2006, About the Council, http://www.veac.vic.gov.au/, accessed 28 June 2006.

Victorian National Parks Association (cited as VNPA), 2004, *Marine National Parks*, http://www.vnpa.org.au/campaigns/marine/marinenps.htm, accessed 25 May 2005.

Walter, H. and Lien, J. 1985, Attitudes of Canadian Students and Teachers toward the Marine

Environment and Marine Education, In, *Marine Parks and Conservation Challenge and Promise*, Lien, J and Graham, R (eds), Vol 1, Henderson Park Book Series, No.10. The National and Provincial Parks Association of Canada. Mri Printing Service, St. John's, Canada.

Wescott, G. 2004, *Implementing Victoria's New Suite of "No-take" Marine Protected Areas: an Analysis of the First Year.* http://www.cdesign.com.au/Coast%20to%20Coast%202004%20(CD%20Proceedings)/pages/coastfinal00046.pdf, accessed 5 July 2005.

Wescott, G. 2005, (in preparation), *The Long and Winding Road: the Development of a Comprehensive, Adequate and Representative System of Highly Protected Marine Protected Areas in Victoria.* Victoria, Australia.

Wilkinson, C., Green, J., Almany, J. and Dionne, S. 2003, *Monitoring Coral Reef Marine Protected Areas: A Practical Guide on How Monitoring can Support Effective Management of MPAs* (Version 1), Australian Institute of Marine Science, Townsville, Queensland, Australia and IUCN Global Marine Program, Gland, Switzerland.

Winchester, H.P.M. 2000, Qualitative Research and its Place in Human Geography, In, *Qualitative Research Methods in Human Geography*, Hay, I. (ed), Oxford University Press, Melbourne, Australia.

Woodbridge Marine Discovery Centre (Department of Education, Tasmanian State Government), cited as Woodbridge MDC, 2003, *Education, Holiday and Travel Programs*, http://www.woodbridge.tased.edu.au/mdc/ accessed 23 April 2005.

WWF-Australia, 2005, *Our Work*, http://wwf.org.au/ourwork/, accessed 29 November 2005.

Zann, L. 1995, *Our Sea, Our Future: Major Findings of the State of the Marine Environment Report for Australia*. http://www.deh.gov.au/coasts/publications/somer/chapter7.html, accessed 14 September 2005.

Zann, L. 2003, The Future: Marine Parks and Multiple – Use Marine Protected Areas. In, *Marine Science for Australian Students*, Moffatt, B., Ryan, T., and Zann, L. (eds) Chapter 22, Wet Paper Publications, Queensland, Australia. Pp 552-599.

Personal Communications

Bell, C. 2005, Co-ordinator, Tasmanian MCCN, Hobart, Tasmania, Australia, 2 August 2005.

Brown, A. 2005, Fishcare, DPIWE, Hobart, Tasmania, Australia, 11 September 2005.

Bryan, J. 2005, Marine biologist, TCT, Hobart, Tasmania, Australia, 11 October 2005.

Campbell, R. 2005, President, TNPA, Hobart, Tasmania, Australia, 14 September 2005.

Cox, D. 2005, Facilitator, Coast Action/Coastcare, Port Phillip East region, DSE, Port Phillip East, Victoria, Australia, 10 August 2005.

Edyvane, K. 2005, Honorary Research Associate, University of Tasmania, Sandy Bay, Tasmania, Australia, 22 June 2005.

Elliott, P. 2005, Secondary Co-ordinator, Woodbridge Marine Discovery Centre, Woodbridge, Tasmania, Australia, 19 October 2005.

Farley, R. 2005, Teacher, Hobart College, Hobart, Tasmania, Australia, 12 August 2005.

Fazackerley, M. 2005, Facilitator, Coastcare, South region, DPIWE, Hobart, Tasmania, Australia, 26 August 2005.

Forster, G. 2005, Facilitator, Gippsland region, DSE, Bairnsdale, Victoria, Australia, 16 August 2005.

Foster, J. 2005, Primary Co-ordinator, Woodbridge Marine Discovery Centre, Woodbridge, Tasmania, Australia, 5 August 2005.

Green, J. 2005, Secretary Fishcare Mornington Peninsula Inc, Victoria, Australia.

Hall, G. 2005, Senior Ranger, PWS, Hobart, Tasmania, Australia, 10 February 2006.

Hrasky, A. 2005, President, Friends of Maria Island MPA, Hobart, Tasmania, Australia, 6 November 2005.

Koch, R. 2005, Senior Ranger, PWS, Triabunna, Tasmania, Australia, 16 January 2005.

Leck, R. 2005, National Marine and Coastal Policy Officer, WWF-Australia, Queensland, Australia, 6 September 2005.

Maynard, D. 2005, Aquarium manager, Seahorse World, Beauty Point, Tasmania, Australia, 12 September 2005.

Roberts, W. 2005, Co-ordinator, Reef Watch, Melbourne, Victoria, Australia, 26 August 2005.

Smit, N. 2005, Teacher, Woodbridge District High School, Woodbridge, Tasmania, Australia, 6 September 2005.

Smyth, C. 2005, Marine Campaign Coordinator, Australian Conservation Foundation, Carlton Victoria, 2005, (Former VNPA Staff).

Steadman, M. 2005, Executive officer, TEC, Hobart, Tasmania, Australia, 12 August 2005.

Sugden, M. 2005, Representative, TMTA, Hobart, Tasmania, Australia, 16 August 2005.

Wilson, R. 2005, Communications Manager, NOO, Hobart, Tasmania, Australia, 10 August 2005.

Wind, A. 2005, Facilitator, Cradle Coast region, Burnie, Tasmania, Australia, 29 August 2005.

School of Geography and Environmental Studies
University of Tasmania
August 2005

Appendix 1: Information Sheet

Review of Marine Education Programs and the Development of Marine Protected Areas in Tasmania

I am an international student currently undertaking a Master of Environmental Management in the School of Geography and Environmental Studies, University of Tasmania, under the supervision of Dr Lorne Kriwoken and Dr Karen Edyvane.

I would like to invite your participation in the following research as a person who has experience in one or more aspects of marine education and marine protected areas. My initial literature review identified that you are an expert in the field and I obtained your contact details from your organisation's web site.

The aim of my thesis is to review and analyse marine education programs (community and school-based) that promote marine protected areas in Tasmania. The project will also develop criteria for identifying and evaluating potential marine protected areas for education purposes in Tasmania. As part of this study, marine education initiatives and programs in the State of Victoria will also be reviewed.

I would be delighted if you would agree to complete the questionnaire attached to this email. Once you have completed the questionnaire please send it as an attachment to my email address (rkasai@utas.edu.au). After the analysis of the questionnaire, I may contact you by telephone to seek further clarification on your responses.

You can choose whether you wish to be named or remain anonymous in the thesis. If there are comments you do not wish to be cited or if you do not want to be identifiable, please bring that

to my attention.

Once the questionnaire has been reviewed it will be stored in a locked cabinet at the School of Geography and Environmental Studies. Electronic copies of questionnaire will not be stored on the main computer or shared computing facilities. Data must be kept for a period of five years, after which all records will be destroyed.

As the project draws to a conclusion in late 2005, I will provide you with a summary report of the findings. Given your position and interest in marine education and marine protected areas, my work may be useful in your professional capacity.

Please note that your participation is entirely voluntary and evidenced by returning the completed questionnaire. In any event, you can decline to answer any question(s), and may elect to withdraw any of your responses at any time prior to write-up without prejudice. If I seek clarification by contacting you by phone, you may decline to respond, and may terminate the phone call at any time.

This project has received ethical approval from the Human Research Ethics Committee (Tasmania) Network (HREC). Inquiries of a general nature about the project may be directed to Risa Kasai (rkasai@utas.edu.au), the Chief Investigator Dr. Lorne Kriwoken (L.K.Kriwoken@utas.edu.au) or Co-investigator Dr Karen Edyvane (Karen.Edyvane@utas.edu.au). If you have any concerns or complaints of an ethical nature about any aspect of the project or its conduct, please contact the Executive Officer of the HREC (Amanda McAully, 03 6226 2763 or Amanda.McAully@utas.edu.au).

Thank you in anticipation of your valued involvement in this research project.

Yours sincerely,

Risa Kasai
School of Geography and Environmental Studies, University of Tasmania,
Private Bag 78, Hobart, Tasmania, 7001 Australia.
Email rkasai@utas.edu.au

Appendix 2: Research Questionnaire

General Questions

1. What marine education (and community awareness) strategies or policies currently exist within your organization/department?

2. How are Marine Protected Areas incorporated into current marine education (and community awareness) programs (primary theme, sub-theme, general)?

3. What values of Marine Protected Areas have been promoted? (eg. biodiversity conservation, integrated management, fisheries tool, education, social and recreational values, etc.)

4. What resources (ie. Full-Time Equivalent's) and funding are allocated annually for marine education activities within your organization/department? How many volunteers are involved?

5. Do you think there is sufficient focus and resources allocated in your organization/department to promote marine education programs and projects that specifically target Marine Protected Areas? If not, what resources do you think are needed?

6. What are the major impediments to increase funding or resources for marine education (and Marine Protected Area awareness) in your organization/department?

7. Which marine education projects and tools do you think have been most effective in raising awareness of Marine Protected Areas and their benefits?

8. Do you think there is a link between effective marine education programs and success in the establishment of Marine Protected Areas in your region? Give some examples.

9. Which Marine Protected Areas in your region are currently used for marine education purposes? Why were they targeted? What are the current projects within these Marine Protected Areas?

10. Are there any other issues/comments you would like to make regarding marine education and Marine Protected Areas?

Project-Based Questions

11. What kind of and how many marine education (community and school-based) and/or Marine Protected Areas projects (or programs) currently exist within your organization? Please answer the following questions for each project. Please list as many as projects you have.

1. Organization, contact person, email and phone number

1. EXAMPLE: University of Tasmania, Risa Kasai, rkasai@utas.edu.au, 03 6226 2839.

2.

2. Title of project(s)

1. EXAMPLE: Community marine education project in Sandy Bay

2.

3. Funding amount, source (s) and year(s) funded

1. EXAMPLE $2,000, EnviroFund, Round 5 (NHT), 2004

2.

d. Type of -raising, training, community art, 'discovery centre', volunteer program, etc)

1. EXAMPLE: Community awareness-raising

2.

e. Target audience (eg. school-based K-12, community, industry)

1. EXAMPLE: Local community

2.

f. Methods used (eg. pamphlets, seminars, posters, monitoring programs, classroom activities, aquarium displays, touch tanks, volunteers, aquatic activities, etc.)

1. EXAMPLE: Seminars on marine biodiversity, which were held on 10th and 20th of May, 2005 and related pamphlets were distributed.

2.

g. Goals of the project (eg. marine pollution, ecosystem-based management, Marine Protected Areas, feral pests, overfishing, etc)

1. EXAMPLE: To raise awareness on local marine biodiversity

2.

e. Has the project been evaluated after being carried out? If yes, how? If no, do you think it is necessary to be evaluated?

Appendix 3: Victoria's Marine National Parks and Marine Sanctuaries

Marine National Parks

Name	Area (ha)	Location	Features	Other
Cape Howe Marine National Park	4,050	Adjacent to Croajingolong National Park and the Cape Howe Wilderness Area.	Granite and sandstone reefs with a high diversity of intertidal and shallow subtidal invertebrates.	The Iron Prince Reef was excluded from the ECC proposal to reduce the impact on the abalone industry.
Point Hicks Marine National Park	4,000	Abutting Croajingolong National Park, about 25km south-east of Cann River in East Gippsland.	Rich marine fauna and flora.	A popular point for snorkelling and SCUBA diving.
Ninety-Mile Beach Marine National Park	2,750	Adjacent to the Gippsland Lakes Coastal Park	The highest species diversity anywhere on the planet: in 10 m2, 860 species were discovered living in the sand. The unusual soft coral.	This park will provide much needed protection from trawling for a small section of the coast.
Corner Inlet Marine National Park	1,550	Comprising two small and separate areas on the southern shoreline of Corner Inlet.	Extensive seagrass beds and high diversity of invertebrates in soft sediments.	Rich invertebrates encourage the over-wintering of migratory wading birds.
Wilsons Promontory Marine National Park	15,500	Along the southern end of Wilsons Promontory National Park and extending 70 km of the mainland coastline.	Granitic marine habitats, underwater scenery and seagrass beds.	The park includes islands that are home to Australian fur-seals, penguins and seabirds.

Bunurong Marine National Park	2,100	Located about 6 km south-west of Inverloch in South Gippsland.	Intertidal platforms and subtidal rocky reefs.	This area includes the sanctuary zone and very popular point for exploring intertidal platforms and rock pools.
Yaringa Marine National Park	980	Adjacent to Quail Island Nature Conservation Reserve, about 9 km south-west of Tooradin.	Saltmarsh, mangroves, sheltered intertidal mudflats, subtidal soft sediments and tidal channels.	Many water birds and wader birds roosting among the mangroves which are vital to the life cycles of numbers of marine habitats.
French Island Marine National Park	2,800	Extending along 15 km of the northern side of French Island National Park.	Mangrove and saltmarsh habitats	Part of the Western Port Ramsar-listed wetlands.
Churchill Island Marine National Park	670	Along the eastern shore of Phillip Island.	Seagrass beds, mangroves, mudflats and sandy beaches.	Part of the Western Port Ramsar-listed wetlands.
Port Phillip Heads Marine National Park	3,580	Locating at southern end of Port Phillip Bay.	Seagrass meadows at Swan Bay, and intertidal platforms at Cheviot Beach and Point Lonsdale.	Ramsar sites at Swan Bay and Mud Island, popular dive locations at Pope's Eye, Portsea Hole, Lonsdale and Nepean walls.
Point Addis Marine National Park	4,600	Extending along 10 km of coastline between Anglesea and Bells Beach.	Ingoldsby Reef and seagrass.	Addiscott Beach is popular for surfing, and Ingoldsby Reef is used for diving and marine education.
Twelve Apostles Marine National Park	7,500	Located 7km east of Port Campbell, this park runs along The Twelve Apostles coastline.	Underwater scenery, rich intertidal and subtidal invertebrate communities and deep sloping reef.	The deep-water Otways sandstone reefs were excluded to reduce the impact on commercial rock lobter fishers.

Discovery Bay Marine National Park	3,050	About 20 km west of Portland and adjacent to Discovery Bay Coastal Park.	A high diversity of intertidal and shallow subtidal invertebrates, including abalone and rock lobster.	The region is well known for whale watching.

Marine Sanctuaries

Name	Area (ha)	Location	Features	Other
Merri Marine Sanctuary	25	At the mouth of the Merri River, Warrnambool.	Range of marine habitats in reef and sand, with rocky overhangs and deep canyons.	Penguin colonies are found and the are is frequently visited by dolphins.
The Arches Marine Sanctuary	45	Located off Port Campbell.	Reefs with sponges, bryozoans, gorgonians and seastars.	Underwater limestone formations near the Twelve Apostles.
Marengo Reefs Marine Sanctuary	12	Near Apollo bay	A wide variety of habitats, a dense growth of seaweeds and an abundance of soft corals and sponges.	There are excellent snorkelling opportunities close to shore. Recreational boat-based fishing is also popular.
Eagle Rock Marine Sanctuary	17	Located at Airey's Inlet.	Kelp forests, and high diversity of invertebrates.	This area is inter-related with Painkalac Creek, which is a highly significant cultural place (Aboriginal interests).
Point Danger Marine Sanctuary	25	At Torquay.	High diversity of intertidal invertebrates on limestone.	Very popular for sightseeing including Aboriginal cultural site and shore walks and visited by large numbers of people is one of concerns of this area.

Barwon Bluff Marine Sanctuary	17	At Barwon Heads.	The sandstone and basalt reefs contain giant and bull kelps and two ship	The shore platforms and shallow reefs of used extensively for marine education and interpretations by schools, universities and the MDC at Queenscliff.
Point Cooke Marine Sanctuary	290	On the western shore of Port Phillip Bay.	Mud and sand beaches and basalt reef.	Popular for bird-watching, snorkelling, diving and boat-based recreational fishing.
Jawbone Marine Sanctuary	30	Close to the Rifle Range Estate near Williamstown.	Rocky basalt reef, seagrass beds, saltmarsh and the largest occurrence of mangroves in Port Phillip Bay.	A roosting site for migratory wading birds.
Ricketts Point Maine Sanctuary	115	At Beaumaris.	Sandstone reefs and sandy beaches with a high diversity of flora and fauna.	This area has diminished in importance over the past few years, especially for commercial abalone harvesting.
Mushroom Reef Marine Sanctuary	80	At Flinders.	The most diverse intertidal rocky reef communities in Victoria.	Beware Reef Marine Sanctuary
Beware Reef Marine Sanctuary	220	Near Cape Conran, East Gippsland.	Granite reefs with bull kelp, a diversity of corals, sponges and anemones, and reef fish.	The reef was used for commercial abalone and rock lobster fishing.

(Adapted from VNPA 2004; ECC 2001)

Appendix 4: Marine Education and MPA Related Projects (Natural Heritage Trust), Victoria, 1997-2004

	Title of projects	Applicants	Project ID	Trust (Commonwealth) Funding	Other Funding	Total Funding	Site	Program
1997-1998								
1	Arbor Week-Cherry Lake (Altona) Schools Community Planting	Natural Resources Conservation League & City of Hobsons Bay	NA	NA	NA	$1,400	NA	Coastcare
2	Coast Education & Adopt a Beach Through Surfschools	Surfing Victoria	NA	NA	NA	$16,200	NA	Coastcare
3	Cunningham Arm Education & Revegetation Project	Lakes Entrance Primary School & East Gippsland Shire Council	NA	NA	NA	$8,620	NA	Coastcare
4	Encourage Local Foreshore Residents to Plant Native Species in Gardens	Frankston High School	NA	NA	NA	$1,200	NA	Coastcare
5	Indochinese Coastal Awareness & Care Project	Springvale Indochinese Mutual Assistance Society Inc.	NA	NA	NA	$4,600	NA	Coastcare
6	Marine Wildlife Awareness & Education	Apollo Bay Wildlife Support Group & Apollo Bay/Kennett River Foreshore Committee	NA	NA	NA	$3,000	NA	Coastcare

7	Toora Birdhide & Educational Viewing Site	Toora & District Progress Association Inc & Parks Victoria	NA	NA	NA	$4,000	NA	Coastcare
8	Victorian Coastal & Marine Schools Projects	MESA	NA	NA	NA	$11,500	NA	Coastcare
9	Wathaurong Aboriginal Schools Curriculum Development	Wathaurong Aboriginal Cooperative	NA	NA	NA	$5,000	NA	Coastcare
10	Cultural Coast Coordinator	Footscray Vietnamese Community and Department of Natural Resources and Environment	NA	NA	NA	$22,500	NA	Coastcare
11	Gippsland Lakes Interpretation Display at Nyerimilang Heritage Park	Friends of Nyerimilang Inc and Parks Victoria	NA	NA	NA	$16,500	NA	Coastcare
12	Sea Marine Studies Guide (Prep Year 12) Revision and Reprint	MESA	NA	NA	NA	$16,000	NA	Coastcare
13	Fox control in Nooramunga Marine and Coastal Park (Yr 2)	Victorian Wader Study Group Inc, Parks Victoria and DNRE	NA	NA	NA	$13,320	NA	Coastcare
14	Limeburners Bay/Hovells Creek Reserve Management Plan	Geelong Revegetation Organisation, City of Greater Geelong and Parks Victoria	NA	NA	NA	$8,500	NA	Coastcare
15	Victorian Koori Coastal Photographic Competition	Victorian Aboriginal Youth Sport and Recreation	NA	NA	NA	$8,500	NA	Coastcare

16	Jan Juc Surf Coast Walk - Cont '98	Jan Juc Coast Action and Torquay Public Reserve Committee of Management	NA	NA	NA	$7,685	NA	Coastcare
17	Redefininf Carpark and Revegetating Battery Hill Reserve	Port Fairy Coast Action Group and Moyne Shire Council	NA	NA	NA	$2,965	NA	Coastcare
18	Access Boardwalk to Shallow Inlet in Wilsons Promontory National Park	Yanakle Coast Action and Parks Victoria	NA	NA	NA	$2,780	NA	Coastcare
19	Eagle Point to Paynesville Lakeside Awareness Trail	East Gippsland Shire Council and DNRE	NA	NA	NA	$2,000	NA	Coastcare
20	Banksia Woodland & Shoreline Restration Within Silverleaves Foreshore Reserve	Friends of Silverleaves Foreshore & Bass Coast Shore Council	NA	NA	NA	$6,830	Silverleaves	Coastcare
21	Interpretive Signs for Merricks Beach Foreshore Reserve	Merricks Beach Foreshore Committee & Parks Victoria	NA	NA	NA	$4,225	Merricks Beach	Coastcare
22	Marine Studies Guide (Prep Year 12) Revision & Reprint	MESA	NA	NA	NA	$16,000	NA	Coastcare
23	Woolley's Beach Reserve Coastcare Project	Crib Point & Stony Point Public Parks & Foreshore Reserve Committee of Management Inc & DNRE	NA	NA	NA	$3,000	Woolley's Beach	Coastcare

24	Fisheries Victoria Community Volunteer Program	Department of Natural Resources and Environment	NA	NA	NA	$68,250	NA	Fisheries Action Program
25	Fish Habitat & Identification Training Project for Community Water Quality Monitoring	Department of Natural Resources and Environment	NA	NA	NA	$10,000	NA	Fisheries Action Program
26	Barwon Estuary Fishwalk	Geelong Fishcare Volunteers	NA	NA	NA	$2,500	NA	Fisheries Action Program
27	Environmental Inventory of Victoria's Marine Ecosystem - Stage 4 (Part 1)	Department of Natural Resources and Environment	NA	NA	NA	$100,000	NA	MPA Program
28	Nesting Shorebird Community Wardening Program (Southern & Eastern Gippsland)	Little Term Taskforce	NA	NA	NA	$20,000	NA	Marine Species Protection Program
1998-1999								
1	East Gippsland Estuarine Monitoring & Education Project	East Gippsland Catchment Management Authority	NA	NA	NA	$18,761	NA	Coastal Monitoring Program
2	Great Ocean Road Shellfish Protection & Education Project	Australian Marine Conservation Society - Great Ocean Road Branch	NA	NA	NA	$16,050	NA	Coastcare
3	Bringing the Coast into the Classroom - Beach Combing Kit	Friends of the Marine Centre	NA	NA	NA	$2,000	NA	Coastcare

4	Coastal Dune Revegetation Project	Friends of the Marine Centre	NA	NA	NA	$8,850	NA	Coastcare
5	Coast Education & Awareness Yarram to Phillip Island	Koonwarra Environmental Education Centre	NA	NA	NA	$4,060	NA	Coastcare
6	Public Awareness	Sandy Point Foreshore Committee of Management	NA	NA	NA	$3,140	NA	Coastcare
7	Cape Paterson Community/Restoration/Education/Works (Cape Paterson Crew)	Cape Paterson Coast Action Group	NA	NA	NA	$11,560	NA	Coastcare
8	Coasts & Marine Education Project	MESA	NA	NA	NA	$17,900	NA	Coastcare
9	Victorian Coasts & Marine Schools Project	MESA	NA	NA	NA	$16,250	NA	Coastcare
10	Weed Removal on the Anglesea Foreshore Reserve	Angair Inc	NA	NA	NA	$5,000	NA	Coastcare
11	Godfrey Ship & Grave Site Protection & Interpretaton	Lorne Historical Society	NA	NA	NA	$18,000	NA	Coastcare
12	Rehabilitation of Remnant Vegetation Along Seaford Foreshore Reserve	Friends of Seaford Foreshore Reserve Inc	NA	NA	NA	$5,000	NA	Coastcare

12	Banksia Woodland & Shoreline Restoration Within Silverleaves Foreshore Reserve	Friends of Silverleaves Foreshore	NA	NA	NA	$6,955	NA	Coastcare
13	Inverloch Coastal Indigenous Botanical Park	Inverloch Coast Action Umbrella Group	NA	NA	NA	$4,785	NA	Coastcare
14	Toora Birdhide & Educational Viewing Site	Toora & District Progress Association Inc	NA	NA	NA	$3,265	NA	Coastcare
15	Beach Access & Weed Control at Harmer's Haven Foreshore Reserve	Harmer's Haven "William Hovell" Foreshore Reserve Committee of Management	NA	NA	NA	$11,000	NA	Coastcare
16	Marine Radio Documentaries	Australian Marine Conservation Society	NA	NA	NA	$11,240	NA	Coastcare
17	Reef Watch - Victoria	MCCN	NA	NA	NA	$24,200	NA	Coastcare
18	Cleanwaters, Cleanseas Coasts & Estuaries Community Monitoring Kit Development	Ecoco Projects	NA	NA	NA	$17,916	NA	Coastcare
19	Participation of Ethnic Communities in Coastal Management	Inter Western Migrant Resource Centre	NA	NA	NA	$22,800	NA	Coastcare
20	Cultural Coast Coordinator	Vietnamese Community in Australia	NA	NA	NA	$25,000	NA	Coastcare

21	Interpretation of Griffiths Island, Port Fairy	Warmambool Field Naturalists Club Inc	NA	NA	NA	$8,700	NA	Coastcare
22	Fox Control/Eradication in Nooramunga Marine & Coastal Park (Year 3)	Victorian Wader Study Group Inc	NA	NA	NA	$12,900	NA	Coastcare
23	Fish-Wise Research Project - Timbarra & Wilkinson Rivers	Meerindoo Youth Accommodation Service	NA	NA	NA	$15,000	NA	Fisheries Action Program
24	Fisheries Victoria Community Volunteer Program	Department of Natural Resources & Environment	NA	NA	NA	$1,000	NA	Fisheries Action Program
25	Identification of Candidate Soft Benthic Marine Protected Areas (Funding approved for the life of the project)	Department of Natural Resources & Environment	NA	NA	NA	$100,000	NA	MPA Program
1999-2000								
1	Community Seagrass Monitoring Program - Mud Island	Friends of Mud Island Inc.	NA	NA	NA	$5,260	Geelong	Coastcare
2	Marlo Foreshore Rehabilitation Awareness	Snowy River Coast Action	NA	NA	NA	$5,797	Marlo	Coastcare
3	Coast & Communities: Linking Ethnic Communities & Friends Groups	Westgate Migrant Resource Centre	NA	NA	NA	$7,880	Altona North	Coastcare

4	Beware Reef - Marine Photographic Collection, Exhibition and Presentation	East Gippsland Underwater Naturalists	NA	NA	NA	$11,430	Bairnsdale	Coastcare
5	Fisheries Victoria Community Volunteer	Department of Natural Resources and Environment	NA	NA	NA	$75,000	Boohill	Fisheries Action
2000-2001								
1	Fisheries Victoria Community Volunteer Program	Department of Natural Resources and Environment	200545	NA	NA	$87,728	NA	Fisheries Action Program
2001-2002								
1	Revegetation and Education, Jan Juc to "The Wave"	Jan Juc Coast Action Group	NA	NA	NA	$22,605	NA	Coastcare
2	Sand Dune Revegetation -an "Edu-action Project"	Friends of the Marine Discovery Centre	NA	NA	NA	$18,815		Coastcare
3	Coastal Dynamics -Community Involvement	Barwon Coast Committee of Management	NA	NA	NA	$2,650	Barwon	Coastcare
4	Forrest Caves Dune Stabilisation and Access Track	Bunarong Land Council Aboriginal Corporation	NA	NA	NA	$21,821	Bunarong	Coastcare
5	Swan Bay Integrated Catchment Management Project	Swan Bay Integrated Catchment Management Committee	NA	NA	NA	$29,800	Swan Bay	Coastcare
6	Balcombe Estuary Reserve Rehabilitation - Stage 5	Balcombe Estuary Rehabilitation Group Inc (BERG)	NA	NA	NA	$11,290	Balcombe Estuary	Coastcare

							Reserve	
7	Weed Removal on the Anglesea Foreshore	ANGAIR	NA	NA	NA	$5,800	Anglesea Foreshore Reserve	Coastcare
8	An Educational Strategy for Pnonty Fishways	Department of Natural Resources and Environment	NA	NA	NA	$84,100	Heidelberg	Fisheries Action Program
9	Freshwater Ecology Education and Awareness Program for Victorian Stream-side Land Holders	Department of Natural Resources and Environment	NA	NA	NA	$48,300	Heidelberg	Fisheries Action Program
10	Fisheries Victoria Community Volunteers Program	Fisheries Victoria, Department of Natural Resources and Environment	NA	NA	NA	$96,500	Box Hill	Fisheries Action Program
Envirofund								
2002-2003								
1	Public Awareness of the Discovery Marine National Park	Friends of the Great South West Walk Inc.	37768	$4,273	$5,891	$10,164	NA	Coastcare
2	Marine Radio Documentary CD & Distributions	Australian Marine Conservatino Society	38182	$14,545	$51,380	$65,925	NA	Coastcare
3	Indigenous Culture Heritage Awareness Project	Kulin Nation Cultural Heritage Organisation	37190	$30,000	$54,420	$84,420	NA	Coastcare

4	Sand Dune Revegetation - An "Edu-Action" Project	Friends of the Marine Discovery Centre	37309	$15,867	$29,100	$44,967	NA	Coastcare
5	Revegetation and Education, Jan Juc to the "Wave"	Jan Juc Coast Action Group	37457	$27,199	$26,250	$53,449	NA	Coastcare
6	Community Education/Planting Indigenous Project	The Portsea Camp	37538	$13,000	$16,750	$29,750	NA	Coastcare
7	Rock Pool Life, Underwater Mysteries	Friends of the Lobster Pot Inc.	37727	$10,000	$34,575	$44,575	NA	Coastcare
2003-2004								
1	Ongoing Bells Beach Reserve Revegetation and Educaton	SANE Surfers Appreciating Natural Environment	42715	$6,320.00	$16,620.00	$22,940.00	NA	NA
2	Do-It-Yourself Illustrared Waterproof Guide to Weeding Herricks Foreshore	Merricks Beach Foreshore Committee of Management Inc	42799	$1,500.00	$1,900.00	$3,400.00	Merricks Beach Foreshore	NA
3	Improve Vegetation Cover and Biodiversity on the Bunurong Coastal Park	Inverloch Residents and Ratepayers Association Inc (Sponsor: Parks Victoria)	45989	$7,381.82	$8,200.00	$15,581.82	Inverloch and Cape Paterson	NA
4	Biological Control of Bridal Creeper on the Beaumaris Foreshore	Friends of Table Rock (Sponsor: Bayside City Council)	41601	$2,000.00	$3,800.00	$5,800.00	Beaumaris foreshore near Table Rock Point	NA

5	Sand Dune Revegetation - An "Edu-action" Project	Friends of the Marine Discovery Centre (Sponsor:Department of Primary Industries)	42031	$16,028.00	$31,300.00	$47,328.00	NA	NA
6	Terrestrial Habitat Maintenance and Sea Grass Monitoring - Mud Island Stage 2	The Friends of Mud Island Inc	42127	$4,400.00	$15,145.00	$19,545.00	Port Phillip Heads NP (partly within a Ramsar wetland)	NA
7	Reef Watch Victoria, Great Victorian Fish Count	Reef Watch Victoria (Sponsor: Australian Marine Conservation Society)	42174	$27,272.73	$51,940.00	$79,212.73	NA	NA
8	Revegetation and Education Continued, Jan Juc to the "Wave"	Jan Juc Coast Action Group	43647	$18,736.00	$19,500.00	$38,236.00	NA	NA
9	Cape Woolamai Foreshore: Coastal Access Improvement and Rationalisation	Cape Woolamai Coast Action Inc	42238	$7,255.00	$7,640.00	$14,895.00	NA	NA
10	Willow Renoval and Native Vegetation Restoration: Fawthrop Lagoon	Portland Field Naturalists Club (Sponser: Glenely Shire Council)	42387	$27,272.73	$35,500.00	$62,772.73	NA	NA
11	Cape Paterson Coastal Plains Vegetation Web	Cape Paterson Coastal Plains Landcare Group	42661	$25,020.00	$41,730.00	$66,750.00	NA	NA

12	Weeds Out - Indigenous Plants In - Country to Coast Working Together	Phillip Island Land Care Group Inc	42854	$26,750.00	$65,875.00	$92,625.00	NA	NA
13	Restration of Shearwater Habitat (Stage 1) at Ventnor, Victoria	Ventnor West Coast Action Group	44907	$10,820.00	$17,405.00	$28,225.00	NA	NA
14	Coastal Habitat Restoration	Capel Sound Foreshore Committee of Management Inc	44982	$5,617.27	$20,150.00	$25,767.27	NA	NA
15	Encouraging Coastal Biodiversity and Influencing Community Attitudes	Killarney Coast Care	45106	$16,675.00	$25,680.00	$42,355.00	NA	NA
16	Northern Precinct Heathland Restoration	Corinella Foreshore Reserve Incorporated	45120	$17,309.09	$16,680.00	$33,989.09	NA	NA
17	Monitoring Marine Biodiversity and Benchmarking at Beware Reef Marine Sanctuary	Bairnsdale SCUBA Club Inc	45435	$7,450.00	$19,520.00	$26,970.00	NA	NA
18	Cape Paterson CREW - Stage 7	Cape Paterson Coast Action Group Inc	45437	$21,409.09	$33,600.00	$55,009.09	NA	NA
19	Community Conservation of Coastal Birds in Gippsland	The Little Tern Taskforce Inc	45772	$11,176.47	$16,800.00	$27,976.47	NA	NA

(Adapted from EA and Department of Agriculture, Fisheries and Forestry 2004)

Appendix 5: Marine Education and MPA Related Projects (Natural Heritage Trust), Tasmania, 1997-2004

	Title of projects	Applicants	Project ID	Trust (C'wealth) Funding	Other Funding	Total Funding	Site	Program
1997-1998								
1	Strategic Action Plan for Sustainable Coastal Camping in the North East	Bay of Fires Landcare Group	NA	NA	NA	$19,870	NA	Coastcare
2	Minimal Impact Boating Management Strategy	Tasmanian Environment Centre Inc.	NA	NA	NA	$16,880	NA	Coastcare
3	Statewide surf site rehabilitation project/Shelly Point Coastal Reserve	Surfing Tasmania Inc.	NA	NA	NA	$12,144	NA	Coastcare
4	South West Tasmania Marine Debris Clean Up and Survey	Surfrider Foundation Tasmania	NA	NA	NA	$10,880	NA	Coastcare
5	Develop a Kit to Raise Awareness of the Marine Environment	Tasmanian Marine Naturalists Association Inc.	NA	NA	NA	$7,800	NA	Coastcare
6	Tasmanian Marine Life Education Project for Schools	Tasmanian Conservation Trust Inc.	NA	NA	NA	$7,275	NA	Coastcare
7	Turning Tasmanian Teachers onto Coastal and Marine Action Programs	MESA	NA	NA	NA	$5,164	NA	Coastcare

8	Environmentally controlled public use of wetlands and beach	Ansons Bay Coastcare Group	NA	NA	NA	$4,845	NA	Coastcare
9	Bandicoots at the Beach, Orford-Stage 2	Orford Primary School/Tasmania Parks and Wildlife Service	NA	NA	NA	$3,820	NA	Coastcare
10	Taroona - Rehabilitation of natural/cultural coastal sites and creeks	Taroona High Primary School Parents and Friends/Tasmania Aboriginal Land Council	NA	NA	NA	$2,310	NA	Coastcare
11	Derwent Foreshore Community Management Participation Program	Windermere Coast/Land Care Group	NA	NA	NA	$2,240	NA	Coastcare
12	Eraducation of Euphorbia paralias (sea spurge) from the Kent Group of Islands	Australian Bush Heritage Fund	NA	NA	NA	$1,860	NA	Coastcare
13	Eradication Methods of Bridal Creeper at Leith/Turners Beach	Parks and Wildlife Service	NA	NA	NA	$359	NA	Coastcare
14	Tasmanian Beach Users Action Guide and Field Days	World Wide Fund for Nature (Threatened Species) Network Tas	NA	NA	NA	$9,298	NA	Coastcare
15	Fish for the Future Education Program and Mobile Display Unit	Department of Primary Industry and Fisheries	NA	NA	NA	$60,620	NA	Fisheries Action Program
16	Ready response - Undaria incursion at Tinderbox Marine Reserve	Department of Primary Industry and Fisheries	NA	NA	NA	$7,000	NA	Introduced Marine Pests

17	Tasmanian Marine Protected Area Strategy: Phase 3	PWS & DELM	NA	NA	NA	$97,904	NA	Marine Protected Areas Program
1998-1999								
1	Community Regeneration of Coastal Vegetation at Four Key Locations on Flinders Island	Flinders Island Council with Local Coastcare Community	NA	NA	NA	$4,119	NA	Coastcare
2	Triabunna Estuary Rehabilitation, Education & Community Revaluing Project	Triabunna District High School/Friends of the Park	NA	NA	NA	$11,655	NA	Coastcare
3	Increase Community Awareness & Involvement in Medeas Cove	Medeas Cove Group	NA	NA	NA	$10,530	NA	Coastcare
4	Implementing a Community Vision for the Gulch, a Maritime Industrial Area at Bicheno	Bicheno Earth & Ocean Network	NA	NA	NA	$5,003	NA	Coastcare
5	The Preservation & Revegetation of Islet Rivulet & Foreshore	Rosetta High School	NA	NA	NA	$3,104	NA	Coastcare
6	Implementation of the North East Sustainable Coastal Camping Strategy	East Coast Regional Development Organisation	NA	NA	NA	$24,885	NA	Coastcare
7	Summer Activities Program	Surf Life Saving Tasmania	NA	NA	NA	$7,940	NA	Coastcare

8	Monitoring & Education Program for a Threatened Tasmanian Seastar	Woodbridge Environment Group	NA	NA	NA	$16,900	NA	Fisheries Action Program
9	Fish for the Future Education Program & Mobile Display Unit	DPIWE	NA	NA	NA	$29,141	NA	Fisheries Action Program
10	Tasmanian Marine Protected Areas Strategy: Phase 3, Additional Work (funding approved for the life of the project)	Parks and Wildlife Service, Department of Environment & Land Management, Department of Primary Industries & Fisheries, Tasmanian Aquaculture & Fisheries Institute	NA	NA	NA	$111,688	NA	MPA Program
1999-2000								
1	Implementation of a Targeted Community Education Program as Recommended by the Draft Bass Strait Nature Reserves Management Plan	MCCN	NA	NA	NA	$8,070	Hobart	Coastcare
2	Goat Island Beach Revegetation and Weed Eradication	Goat Island Foreshore Group	NA	NA	NA	$685	Ulverstone	Coastcare
3	Coastcare Education and Action Program	MESA	NA	NA	NA	$33,935	Hobart	Coastcare

4	SA Clean Seas Education and Action Program	Tasmanian Environmental Centre and Surfrider Foundation	NA	NA	NA	$11,690	Hobart	Coastcare
5	Taroona Coastal Community Training Project	Taroona Environment Network	NA	NA	NA	$16,598	Taroona	Coastcare
6	The Preservation and Revegetation of Islet Rivulet and Foreshore Tidelines - Reading the Messages in the Sand. A Coast - Caring Community Art Programme	Flinders Island Wind Festival	NA	NA	NA	$5,700	Flinders Island	Coastcare
7	Whale Rescue Equipment Trailers & Community Training Program	DPIWE	NA	NA	NA	$74,800	NA	Marine Species Protection Program
8	Fish for the Future Education and Mobile Display Unit	DPIWE	NA	NA	NA	$30,632	NA	Fisheries Action
2000-2001								
1	Education & Training for Local Government Works Crews	Greening Australia (TAS)	NA	NA	NA	$4,600	Kingborough and Huon Valley	Coastcare
2	Education Campaign for Seakayakers Visiting Sensitive Coastal Environments	Tasmanian Sea Canoeing Club Inc	NA	NA	NA	$7,950	NA	Coastcare

3	Tasmanian Coastcare Festival	Coastcare Tasmania	NA	NA	NA	$16,692	Statewide	Coastcare
4	Tasmanian Coastcare Education & Action Program - Stage 2	MESA	NA	NA	NA	$19,868	Around the State	Coastcare
5	Tasmania's Evolving Coastline - the Production of an Information Phamphlet	Coastcare Tasmania	NA	NA	NA	$6,785	North West, North East and South	Coastcare
6	Implementation of the Millingtons Beach Conservation Area Strategic Works Program	East Coast Regional Development Organisation	NA	NA	NA	$2,916	Orford	Coastcare
7	Coastal Bush Regeneration by the Cape Barren Island Community	Cape Barren Island Community Assoc Inc	NA	NA	NA	$2,536	Cape Barren Island	Coastcare
8	Rocky Cape to Stanley Coastal Management Program	Stanley Peninsula Land & Coastcare	NA	NA	NA	$28,990	The 30 km coastline between Rocky Cape NP and the National Estate	Coastcare
9	Indigenous Coastal Vegetation Enhancement of North West Tasmania	Australian Plants Society Tasmanian Incorporated	NA	NA	NA	$3,122	North West	Coastcare

10	Improved Management of Goat Island Nature Reserve	Penguin Monitoring Group	NA	NA	NA	$6,200	Goat Island reserve	Coastcare
11	Trial Harbour Foreshore Protection & Rehabilitation Project Stage 2	Trial Harbour Coastcare Group	NA	NA	NA	$26,250	Trial Harbour	Coastcare
12	Granville to Pieman Aboriginal Site Protection & Track Rehabilitation	Tasmanian Recreational Vehicle Association Inc	NA	NA	NA	$12,810	NA	Coastcare
13	Changing Community Attitudes to Reduce Threats to Fish Populations and Habitats	DPIWE	117	NA	NA	$87,000	NA	Fisheries Action Program
14	Community Based Monitoring of the Distribution of the Intriduced Seaweed Undaria Pinnatifida	Seacare Inc	119	NA	NA	$20,000	NA	Fisheries Action Program
15	Fishcare Volunteers Extension Program	DPIWE	154	NA	NA	$71,380	NA	Fisheries Action Program
2001-2002								
1	Community Action on Sea Spurge (Brochure and Workshop Program)	MCCN	NA	NA	NA	$5,294	NA	Coastcare
2	Island Care: Community Capacity Building	MCCN	NA	NA	NA	$10,180	NA	Coastcare

3	Coastcare Education Tertiary Training Program	MESA	NA	NA	NA	$14,919	NA	Coastcare
4	Beachcombers: Monitoring Marine Debris and Human Impacts	Tasmanian Environmental Centre	NA	NA	NA	$18,227	NA	Coastcare
5	Handbook for Coastcare Groups - A guide to Action	Tasmanian Environmental Centre	NA	NA	NA	$28,050	NA	Coastcare
6	Rehabilitation and Revegetation of Freers Beach Coastal Reserve	Rubicon Coast and Landcare Group Inc	NA	NA	NA	$3,000	NA	Coastcare
7	Rehabilitation of Little Swan Point Foreshore Reserve	Friends of Little Swan Point	NA	NA	NA	$4,742	NA	Coastcare
8	Penguin Protection and Habitat Enhancement on Coastal Reserve	Penguin Coastcare	NA	NA	NA	$6,997	NA	Coastcare
9	Abels Bay Coastal Revegetation and Restoration	Abels Bay Coastcare	NA	NA	NA	$2,364	NA	Coastcare
10	Esperence Revegetation Project in the Far South	Port Esperance Coastcare Group	NA	NA	NA	$4,466	NA	Coastcare
11	Stewarts Bay Coastal Environment Regeneration Project	Stewarts Bay Coastcare Group	NA	NA	NA	$4,329	NA	Coastcare
12	Coningham - Oyster Cove Foreshore Regeneration and Education Project	Friends of Coningham - Oyster Cove - Lower Snug	NA	NA	NA	$6,623	NA	Coastcare

13	Derwent Foreshore Vegetation Map: Information for Community Action	Tasmanian Conservation Trust	NA	NA	NA	$16,364	NA	Coastcare
14	Taroona Coast Community Training Project Stage 2	Taroona Environment Network	NA	NA	NA	$3,203	NA	Coastcare
15	Derwent River Community Riverkeeper Project	Tasmanian Conservation Trust	NA	NA	NA	$27,657	NA	Coastcare
16	Rehabilitation of Coastal Access and Viewing Points in the Four Mile Creek Conservation Area	NE Boardriders and Friends of Four Mile Creek Bushcare Group	NA	NA	NA	$6,125	NA	Coastcare
17	Protection and Rehabilitation of the East Shelly Beach Foreshore	East Shelly Beach Coastalcare Group	NA	NA	NA	$7,148	NA	Coastcare
18	Prosser River Estuary Celebration Project	Eastcoast Regional Development Organisation	NA	NA	NA	$8,514	NA	Coastcare
19	Coal Point Site Redevelopment - Adventure Bay, Bruny Island	South East Tasmania Aboriginal Corporation	NA	NA	NA	$14,310	NA	Coastcare
20	Ragwort and Horehound Control on Deal Island	Marine and Coastal Community Network	NA	NA	NA	$4,250	NA	Coastcare
21	Changing Community Attitudes to Reduce Threats to Fish Populations and Habitats	DPIWE	NA	NA	NA	$100,700	Hobart	Fisheries Action Program

22	Fishcare Volunteers Extension Program	DPIWE	NA	NA	NA	$94,400	Hobart	Fisheries Action Program
			Envirofund					
2002-2003								
1	Community Guidelines to Evaluate the Health of the Intertidal Zone	The Tasmanian Marine Naturalists Association Inc	38516	$2,500	$4,080	$6,580	NA	Coastcare
2	Tinderbox West Coastal Reserve - Community Caring for the Coast	Tinderbox West Coastcare Group	38125	$6,572	$12,210	$18,782	NA	Coastcare
3	Rehabilitation of the Coast Reserve and Community Access Trail: Whitemark to Long Point	Westside Landcare Inc	38867	$8,400	$8,790	$17,190	NA	Coastcare
4	Community Care and Protection of the Port Cygnet Conservation Area	Tasmanian Environment Centre	38401	$13,430	$11,580	$25,010	NA	Coastcare
5	Regionalisation of Tasmanian Fishcare Volunteers	Tasmanian Fishcare Volunteers	38730	$27,250	$34,425	$61,675	NA	Coastcare
6	A Coastcare Project to Protect Coastal Values at Peron Dunes and Educate Four Wheel Drivers Users Around Tasmania	Tasmanian Recreational Vehicle Association	38385	$11,770	$14,700	$26,470	NA	Coastcare

7	A Coast Care Project to Revegetate Coastal Reserve Areas at Seymour Longpoint	Seymour/Longpoint	38425	$8,207	$9,510	$17,717	NA	Coastcare
8	Foreshore Restration and Penguin Protection at Coswell Conservation Area, Swansea	Friends of Coswell Conservation Area, Coastcare Group	38311	$20,955	$19,725	$40,680	Swansea	Coastcare
9	Robbins Passage Wetlands Community Awareness Program	Robbins Passage Wetlands Coast & Landcare Group Inc	38693	$17,800	$18,740	$36,540	NA	Coastcare
2003-2004								
1	Brid-Forester Community Coastal Management Project	Brid-Forester Integrated Catchment Group Incorporated	46078	$2,711	$4,565	$7,276	Brigport	NA
2	The Derwent Community Penguin Project	Derwent Estuary Program (Sponsor: Tas Conservation Trust Inc)	46081	$25,200	$47,730	$72,930	Derwent Estuary	NA
3	Management Plan and Priority On-Ground Works for the George Town Coastal Reserve, North Tasmania	Tamar Region Natural Resource Management Strategy Reference group	46115	$26,367	$61,700	$88,067	George Town	NA
4	Sand Dune Protection for Beach Access - North Freers Beach	Rubicon Coast and Landcare Inc.	44901	$4,022	$3,000	$7,022	NA	NA
5	Regeneration of Native Coastal Bushland at Mortimer Bay	Mortimer Bay Coastcare Group Inc	45126	$15,880	$20,140	$36,020	Mortimer Bay	NA

6	Enhancement of Little Penguin Coastal Habitats	Penguin Monitoring Centre (Sponsor: Equity Intowork Inc)	45275	$4,251	$30,278	$34,529	Burnie and Ulverstone	NA
7	Development and Implementation of Oyster Cove Slipway Waste Management System	Anstead Pty Ltd	45424	$27,272	$45,494	$72,766	NA	NA
8	Penguin Habitat Enhancement on Coastal Reserve	Peguin Coastcare Group	46069	$1,381	$10,440	$11,821	Tea Tree Point	NA
9	Prosser River Estuary Rehabilitation and Community Education Project	Prosser River Estuary Coastcare	43395	$16,428	$21,278	$37,706	Orford	NA

(Adapted from EA and Department of Agriculture, Fisheries and Forestry 2004)

Appendix 6: Marine Education Programs Currently Offered at the Queenscliff Marine Discovery Centre in Victoria

Program Title and Suitable Grade	Activity
Early Childhood Program (Ages 2-4)	The program provides hands-on experiences of marine life. Special emphasis is placed on careful handling of the animals and respect for their survival needs. Active exploration and investigation using all of the senses is encouraged. Parents, babies and small children are welcome to attend and share in the experience.
Early Childhood Program (Ages 4-6)	The program provides hands-on experiences of marine life and encourages active exploration and investigation using all of the senses. Within the program, experiences encompass all developmental areas and are presented to children in such a way as to facilitate self-directed learning similar to that nurtured in early childhood settings. Children actively explore the sea-life, aquaria, displays and artefacts in the Centre. Following this, action stations in our Marine Discovery Room include mini touch tank, imaginary play, picture-story books, artefact cubby, puzzles and more.
Primarily School Program (Year 1-6)	The program is based on the Victorian Curriculum and Standards Frameworks and includes classroom sessions, field trips, and boat trips. All visits to the Marine Discovery Centre include time in the aquarium room and at the popular touch tank where students can safely touch and handle live marine animals and plants. Field based activities include rockpool rambles at Barwon Heads or Point Lonsdale, mudflat meanders at Swan Bay, beach walks and beachcombing, sand dune revegetation and boat trips on Port Phillip Bay.
Secondary School Program (Year 7-10)	The program is also based on the Victorian Curriculum and Standards Frameworks and includes sessions in our senior students laboratory, our marine education classroom, field trips and boat trips. All visits to the Marine Discovery Centre include time in the aquarium and at the popular touch tank where students can safely touch and handle live marine animals and plants. Activities focus on the use and development of investigative skills in a variety of field and laboratory settings.

Victorian Certificate of Education (VCE) Program (Year 11 & 12)	All VCE programs conducted at the Marine Discovery Centre meet the criteria of work requirements in biology, geography, environmental science, outdoor education and art. Most VCE activities are field based, including studies of intertidal rocky shores, mudflat communities, marine biology cruise on Port Phillip Bay, snorkelling, sand dune ecology, coastal catchments and others. Laboratory sessions include in-situ analysis of community structure, reproductive strategies, marine plant diversity and dissections.
Working Experience Program (Year 10 or above)	The programme offers students the chance to experience the work of marine biologists and marine education officers. Students undertake such tasks as aquarium maintenance, feeding of marine animals, collection of specimens for display and also assist education officers with different activities such as boat trips, rockpool studies and mudflat studies.
Tertiary Student Program (Undergraduate)	The Marine Discovery Centre offers specialised courses designed for undergraduate needs, focussing on temperate marine ecology, advances in marine sciences, systematics and effects and issues associated with human impact on marine ecosystems.
Sand Dune Revegetation Program	The program is designed to give students hands-on experience in sand dune stabilisation and revegetation work. It is suitable for secondary school students who may be studying geography, environmental science, biology or science.
Professional Development Programme	For Primary teachers: 1) Creative Strategies for environmental education: A programme for teachers wishing to use the coastal environment and creative techniques as a part of a primary arts programme. 2) Primary science in the marine environment: This workshop will provide participants with strategies for establishing a marine science unit or programme. Includes a boat trip on Port Phillip Bay. 3) Marine Maths: Some exciting ways to bring your maths classes alive with the wonders of the sea.

(Adapted from Queenscliff Marine Discovery Centre 2004)

Appendix 7: Marine Education Programs Currently Offered at the Woodbridge Marine Discovery Centre in Tasmania

Program Title and Suitable Grade	Activity	Other information
Fish Printing (Primary)	Use real flounder for printing on paper or calico.	NA
Fishing for the Future (Year 7 & 8)	Focus on different fishing methods used commercially around Australia, biology of commercial species, net and trap designs, legal limits, man's responsibility to maintain the fishery.	Day trip
Marine Biology (Year 7 & 8)	A comparison of the biodiversity of the benthic population of two sites in the D'Entrecasteaux Channel - for the serious science student, will include some simple classification, adaptations and examine the effects of introduced species on these environments.	Day trip
Marine Inspiration (Year 7 & 8)	These trips are for Art or Language classes keen to use the marine environment for inspiration. Art classes will work around the Centre and are able to use live specimens, from microscopic to macroscopic, as subjects. Language classes spend time on the RV Penghana having a nautical experience for inspiration. The Centre suggests a combination of these with half the day on Art theme and the other half on Language activities.	Day trip
Marine Studies (Year 9 & 10)	A comparison of the abiotic conditions and biodiversity of the benthic population of two sites in the D'Entrecasteaux Channel - for the serious science students, will include classification, feeding relationships, adaptations and examine the effects of introduced species on these environments.	Day trip
Foreshore Ecology (Year 9 & 10)	Dependent on favourable tides, use different methods to sample the variety of life on the foreshore, what are the problems of living in a tidal zone and how do different animals and plants adapt to these extreme conditions.	Day trip
Aquaculture (Year 9 & 10)	Study the different methods used to farm species in the sea, examine the possible impacts of aquaculture on the environment and see at first hand aquaculture operations on the channel.	Day trip

Aquaculture Programs (Year 9 & 10)	The Centre has a mussel and scallop farm lease. Visit the local Atlantic salmon and shellfish industry on the RV Penghana. View baby crayfish and Macrocystis culture tank, donated by Seacare. The Marine Discovery Centre cultures Giant String Kelp (Macrocystis pyrifera) for replanting to aid the declining populations of this seaweed.	NA
Foyer - Man's Impact on the Marine Environment	Aquaculture methods, Introduced species, Pollution, Boat safety. (Year 11 & 12)	Day trip / Activities around the Centre
Marine Pond and Touch Tank (Year 11 & 12)	Vertebrate and invertebrate adaptations, Commercial species identification, Legal fishing limits.	Day trip / Activities around the Centre
Aquarium Room (Year 11 & 12)	Classification, Feeding relationships.	Day trip / Activities around the Centre
Secondary Laboratory (Year 11 & 12)	Plankton survey, threatened species and marine reserves, 'Ecotrekker' and 'The Bay' software, Depth sounders and profiles of the sea bed, tides and weather, nutrient levels in the sea water.	Day trip / Activities around the Centre
Secondary Laboratory (Year 11 & 12)	Measurement of dissolved oxygen, temperature, salinity and turbidity. Students can compare: information from a number of sites, for example, varying depths, varying exposure to environmental conditions, and varying influence by man. The Centre can provide: preserved plankton, previously collected data, reference information - books, journals and websites, local marine expertise.	Day trip / Activities on the RV Penghana
Secondary Laboratory (Year 11 & 12)	Students can collect samples using: plankton tow, dredge, drop line, long line, fish trap, water sampler, benthos grab.	Day trip / Activities on the RV Penghana
Secondary Laboratory (Year 11 & 12)	Students can visit: salmon farm in northern Tasmania, BAILINGA mussel/oyster farm. Note: these visits are not contact visits. Participants can view the operation from the sea at close proximity, but do not go onto the farms. Snake Island or Apollo Bay foreshores for environmental survey.	Day trip / Activities on the RV Penghana

(Adopted from Woodbridge Marine Discovery Centre 2003)

Appendix 8: Marine Education Programs, Projects and Events Currently Offered by Coastcare in Victoria and Tasmania

	Program Title	Target Audience	Fund
Victoria	Community monitoring in West Gippsland	Community (Monitor water quality in catchment and marine environment)	Coast Action/Coastcare
	Bass Valley Primary School, mangrove and seagrass planting at Coronet Bay, and Westernport Bay[8]	Local Primary School	Community support grant from Coast Action/Coastcare
Tasmania	Coastcare Forum – Managing & Monitoring Coastal & Marine Wildlife & Habitat August 2005	Coastcare & Fishcare volunteers, Waterwatch & NRM Facilitators, PWS Rangers, Councils, Developers, Students	Coastcare (NHT) & registration costs for non-volunteers
	Little Penguin Poster	Coastcare & Fishcare volunteers, Waterwatch, NRM, PWS, Councils, DPIWE, Tourism operators	Coastcare (NHT)
	Coastcare Forum – Whales, Whale rescue, Seals etc	Coastcare & Fishcare volunteers, Waterwatch, NRM, Green Corps	Coastcare (NHT)
	Seaweek display – Save Our sharks	General public	Coastcare (NHT)
	Primary School Poster Competition	Primary School children	Coastcare (NHT)
	Waterwatch Seminar – Coastcare Build a Beach Activity	Students	Coastcare (NHT)

(Adopted from DSE 2005; Cox, pers. comm., 2005; Wind pers. comm., 2005)

[8] This project is practical on site planning for trial restoration of seagrass and mangroves.

Appendix 9: Marine Education Programs, Projects and Events Currently Offered by Fishcare in Victoria

Activity Title	Targeted Audience	Funding	Others
Get Hooked...Its fun to fish	Year 5 and 6 students.	$500 from the City of Frankston to cover equipment, printing of certificates and student travel expenses.	Methods used: Touch tanks, displays, pamphlets/posters, classroom, dried specimens. Main goal of three projects is to inform about marine pollution caused by marine litter and marine pests.
Casey Environmental Expo (3 days)	Year 5 and 6 students.	NA	
Mornington Water Awareness Day	Secondary school students (Year 7 to 9) students.	NA	

(Adapted from Green, pers. comm., 2005; Fishcare Victoria 2005)

Appendix 10: Marine Education Projects and Events Proposed by Fishcare in Tasmania (2005-2006)

Project Title	Funding Organisations	Summary
Extending Marine Links Package (1) - upgrade, extension and inclusion of Aquaculture	Fishwise	This is a collaborative project comprising 3 major proponents being the School of Aquaculture, University of Tasmania, Woodbridge High School, Dept of Education and Fishcare, Dept of Primary Industry Water & Environment (inc the Marine Farming Section). Between these organisations there is a broad base of expertise in curriculum development, teaching, research, science, industry experience, industry collaboration and resource management. Supporting proponents/collaborators have also been identified to provide specialised expertise in the areas of specific training, private enterprise experience and proficiency plus peak industry body for technical knowledge and transferable application. The initial Marine Links package was developed as a project between Dept of Education and DPIWE as a core package focused on marine ecology with the long term objective of extending the package further to incorporate other specific modules (aquaculture, commercial fisheries, environment, policy etc). Consequently the group of collaborators is comprehensive and extensive. At this stage all of the proponents will be kept advised but may not contribute at this level. This stage of the educational package development will concentrate primarily on the inclusion of aquaculture.
Extending Marine Links Package (2)	Cradle Coast	A joint project between Dept of Education, the University of Tasmania and DPIWE is seeking to update, upgrade and extend the Marine Links Package to ensure our Tasmanian schools have the ability to present the most current fisheries information and insights on to our future fishing generation. The objective was to provide participating students with a basic and consistent background in Marine Resource related fields. To give a student the confidence to make an informed choice of continuing their marine resources studies through to Year 12/University/College or equip the student to enter a marine resource associated workforce with an advanced background and a concept of the critical need for sustainability of resources.

Fishcare School Program	Fishwise	The Fishcare Volunteer Program is seeking support to continue the highly successful Schools Education Program. This program has received a number of accreditations over the past 6 years including the recent Regional and State Awards from the Dept of Education for Educational Excellence. This program is a collaborative effort between the Woodbridge High School (including the Marine Study Centre) and the Fishcare Program. Fishcare Volunteers are formally trained and qualified to deliver a consistent and current 'sustainable fisheries' message to Tasmania's primary schools as a classroom module and as a skills development activity in the field. Monitoring and evaluation is conducted by the Dept of Education firstly at the training level then as feedback from the school.
Signs Lines & Scrutinize	Fishwise	A 'first-step' educational/awareness tool is to ensure simple basic information is provided at the best vantage points. By providing an onground infrastructure of easily interpreted signage at the most common fishing sites it will ensure fishers have no reason to either not comply with the directives or understand they need to seek further information. Fishing guide/rule books are useful as reference material but are (by necessity) complex and rarely carried to the fishing site. The Fishcare Volunteers are keen to use this educational method to assist their rule interpretation and awareness work at major sites around the State. This work will be conducted as an extra part of the normal Fishcare Volunteer duties. For this reason it is envisaged that the term of the project is likely to be 2 years.
Major Events 2005	Fishwise	Increase and reinforce community and volunteer awareness of rules, regulations and other issues relating to marine and freshwater resources. Increase the professional and personal development training of volunteers. Increase community and volunteer awareness of the need to promote responsible fishing through personal interaction and hearing from conference guest speakers. Reinforce pride in being a Fishcare Volunteer and generate greater ownership of the program. Volunteers will learn more about each other and what issues, promotions, events, representations occur in other localities.
North-west Educational	Fishwise	Funding is sought to construct a small education and display trailer for the NW region of the Fishcare Volunteers. For the past 6 years Recreational Fisheries, DPIWE in conjunction with Fishcare Volunteers, the Marine Police and Inland

Trailer		Fisheries have managed a fleet of three display trailers. The trailers are used as mobile educational and display units which are towed around the State for shows: (Agfest, Hobart, Launceston, Burnie and many country shows), events (Take a Kid Fishing Days, Greek Festivals, open days, launches) educational days (Museum events, Science week, School excursions, school fairs and conferences) etc. Structural changes within Recreational Fisheries, Fishcare and the Marine Police have required a review of the use of these trailers. Currently the Fishcare Volunteers have undertaken an increasing role in using the trailers and supplying support personel for these trailers. As a focal point for information dissemination and an educational platform these mobile units are rated as one of the most effective and efficient ways of contacting large numbers of people. Records show that in one year over 250,000 people had some contact with the trailers.
Printing Fishing Information	Fishwise	The aim of this project is to provide a presentable, informative and accurate resources for fishers, educators and the community. The 2004 review of the Scalefish fishery management plan saw major changes to rules in this fishery. The most extensive change has been the removal of daily bag limits which have been replaced with an overall possession limit. Two of the main communications products for recreational fishers, the "Fishing around Tasmania" fishing information sheets and the "Fish Facts", both include important information about size and bag limits and are therefore out of date. Both of these resources have proved to be extremely popular and effective tools to promote compliance with rules whilst providing useful information about how to target popular Tasmanian fish species. The fishwise community grant would fund: 1. Printing process; 2. Design where necessary; 3. Access to existing copy-right "Fishing around Tasmania" guides for upgrading and reprint; 4. Access to relevant fishing information for additional "Fishing around Tasmania" guides from a professional fishing writer; 5. Access to photographs of species not available in the existing photographic library held by DPIWE.
Sea Fishers of Tasmania Poster	Fishwise	This project proposes to redesign and print a new "Sea Fishes of Tasmania" poster reflecting current recreational target species, using photographs rather (than drawings as in the past) and current size and bag limit information.

Fish Identification information and Stations	Recreational Fishing Community Grants	This project will design, develop and erect 30 fish identification and measuring depots complete with boating requirements and emergency phone numbers at major recreational fishing and boating sites around Tasmania. Specific local information will include recreational bag and size limits, area restrictions and wildlife issues. A photographic register and database will be established and maintained. A project coordinator with graphic artistry skills will be employed to organise the images and art work necessary to create the information panel and design the structure. This person will be required to collaborate between all parties during the design and manufacture phase as well as develop a maintenance strategy.

(Adapted from DPIWE 2005)

Appendix 11: Education Programs Currently Offered by Parks Victoria

Program Title	Activity	Objectives
	Primary School Level	
Curriculum and Standards Framework (CSF) II Units/Park Natives[9]	Science (Level 1) • Describe, using appropriate language, scientific explorations of the chemical, physical and natural world.	• Familiarise students with Australian native plants and animals. • Introduce the concept of introduced species- both plants and animals. • Introduce the concept of an ecosystem. • Investigate how living things depend on one another for food
	SOSE (Level 1): Family and Neighbourhood • Describe aspects of the student's life in familiar environments. • Explain why families and other groups have rules, and how these rules are applied. • Illustrate how people use and care for familiar environments.	
	Science (Level 2) • Identify simple patterns in observations arising from explorations of readily observable phenomena.	

[9] This program includes study of native flora and fauna, protection, introduced species, rules in parks, caring for parks and the environment, safety in the park, using all the senses for observation and exploration of the environment.

	SOSE (Level 2): Community and Participation • Examine change over time in the local community and environment. • Explain what it means to be an active member of school and other groups within the community. • Explain how and why resources are used and managed in the local community.	and shelter • Learn to care for parks and the environment. • Understand that parks provide opportunities for various types of recreation. • Cater for local wildlife by planting indigenous species.
Endangered Species (Level 3&4)	Science (Level 3): Biological Science and Living together (past, present and future) • Describe environmental factors that affect the survival of living things. SOSE (Level 3): Australia's people and places • Compare how people use environments in Australia Science (Level 4): Biological Science and Living together (past, present and future) • Identify relationships between living things which help them survive in their habitat. SOSE (Level 4): Geography • Analyse different views about the use and care of Australian places.	• Understand the process of how species become endangered. • Develop an understanding of strategies used by Parks Victoria to assist threatened species. • Develop strategies to improve habitats at a local level. • Participate in activities to reduce impacts on endangered animals.

Park Ferals (Levels 3,5 & 6)	Science • Describe environmental factors that affect the survival of living things. • Describe interactions between living things and between living things and their non-living surroundings. • Identify relationships between living things that help them survive in their habitat.	• Initiate an understanding by students of the concept of introduced species. • Empower students to investigate the effects of introduced species on Australian flora and fauna. • Develop an understanding of strategies used by Parks Victoria and other agencies to control introduced species. • Encourage students to engage in activities that reduce the impacts of introduced species.
	SOSE • Examine change over time in the local community and environment.	
	Geography • Explain how natural processes and human activities change environments. • Develop a comprehensive strategy to resolve an issue related to the use and management of a natural or human environment. • Explain how people's use of natural and human environments changes over time. • Develop a plan to address impacts of change. • Explain the process of interactions between people and major natural systems.	
Secondary School Level		
Curriculum and Standards Framework (CSF) II Units/Parks,	SOSE (Level 5): Geography • Explain how natural processes and human activities change environments. • Explain how people's use of natural and human environments changes over time. • Develop a plan to address impacts of change.	• Develop an appreciation of their impact on the environment when undertaking outdoor activities. • Understand the need for, and will

People and Outdoor Activities (Level 5&6)	SOSE (Level 6): Geography • Explain the processes and interactions between people and major natural systems. • Predict the effects of resource development and use on a selected natural and human environment. • Develop a comprehensive strategy to resolve an issue related to the use and management of a natural or human environment.	practice, minimal impact behaviour when undertaking outdoor activities in parks. • Appreciate the need for laws, rules and codes to govern human interaction with parks and the environment.
Curriculum and Standards Framework (CSF) II Units/Wetlands (Level 4&5)	Science (Level 4): Biological Science • Identify relationships between living things which help them survive in their habitat. • Describe how selected systems of plants and animals function.	• Observe a variety of freshwater and/or estuarine creatures. • Identify reasons why we need to conserve our wetlands. • Explore ways in which the quality of our wetlands can be improved.
	SOSE (Level 4): 1. Geography • Locate and explain the distribution of significant natural and built features both in regions of Australia and globally, using maps and other geographical techniques. • Describe the distribution of population in Australia and explain changing patterns of land use (SOGE0402.). • Analyse different views about the use and care of Australian places.	
	Economy and society. • Explain how decision making affects the use of resources.	

	Science (Level 5): Biological Science • Explain the biological basis of classification of organisms into major groups. • Describe interactions between living things and between living things and their non-living surroundings.	
	SOSE (Level 5): Geography • Compare the characteristics of significant regions in Australia and the world. • Explain how natural processes and human activities change environments. • Explain how people's use of natural and human environments changes over time. • Develop a plan to address impacts of change.	
Victorian Certificate of Education		
Curriculum and Standards Framework (CSF) II Units/Tourism in Parks	Geography 1. Place and Change • Describe and analyse the natural processes and human activities that alter places. • Predict how natural processes and human activities may alter places. 2. Resources • Describe and explain the geographic characteristics of resources. • Evaluate policies designed to manage resource development and use. • Describe and justify a policy for the future use of a resource, using data collected in the field.	• Develop an understanding of the range of tourist opportunities, the impacts of tourism and some management strategies involved in sustainable development.

	Outdoor and Environmental Studies 1. Understanding Nature • Describe ways in which humans understand, encounter and respond to nature. 2. Environmental Impacts • Explain factors which influence outdoor experiences and their impact on nature. • Analyse policy and procedures for minimising human impact on natural environments. 3. Relationships with Outdoor Environments • Analyse how particular perceptions and relationships have influenced an outdoor environment. • Explain the evolution of human-nature relationships and their impact on the contemporary outdoor environment. 4. The Future of Natural Environments • Evaluate practices and strategies for the sustainable interaction of humans and outdoor environments. • Evaluate processes of decision making which affect the use and sustainability of outdoor environments.	

	Environmental Science 1. The Environment • Analyse one human-induced environmental change and the options for remediation. 2. Monitoring the Environment • Investigate and report on a local example of environmental degradation or an environmental issue, using an appropriate monitoring program.	

(Adapted from Parks Victoria n.d.)

Appendix 12: Marine Education Program Currently Offered by the PWS (The Shipwrecks, Sealers and Scientists on Macquarie Island Internet Project)

Activity Title	Activity
Present the stories	Teachers could initiate a unit of work based on Shipwrecks, Sealers and Scientists on Macquarie Island by asking the students to present, either individually or in groups, some or all of the 43 stories contained in The Shipwreck Watch, The Sealers Shanty and The Science Observer journals. Students could be given a week or two to develop imaginative ways of presenting the stories. They should be encouraged to present the stories in ways that involve several art forms such as art, craft, music and drama.
Plan activities and assessment criteria	<English> 1. Speak and listen effectively in a range of formal and informal situations. 2. Read and view a variety of texts in order to explore issues, values and personal experiences. 3 Write achieving appropriate accuracy of expression. 4. Write to increase understanding of texts and to make connections with personal experience. 5. Create and craft a range of texts for a variety of purposes and audiences. 6. Appreciate and analyse the structures and features of spoken, written and visual text. 7. Understand ways in which culture, values and experiences shape the construction and interpretation of texts. 8. Use technologies to access information, compose texts and communicate with different audiences. 9. Work effectively with others in a variety of group situations for a range of purposes. 10. Set and achieve goals for their own learning through negotiation, reflection and making independent judgments.
	<Studies of Society and the Environment> 1. Recall and understand facts and information. 2. Demonstrate awareness of current events. 3. Find and use information. 4. Form a reasoned opinion. 5. Communicate ideas and information. 6. Plan, organise and undertake activities. 7. Work with others and in teams.
Devise a Game	Students could work collaboratively to invent a board game or some other type of game based on some the stories and information in the Shipwrecks, Sealers and Scientists on Macquarie Island site. The game may involve one or two simple rules such as 'the game must have some form of currency', or 'each player must represent one of the people or animals mentioned in the stories'.
Hold a Debate	Brainstorm topics for debate then organise a debate or series of debates. Here are three possible topics: I. 'Macquarie Island has a fragile

	environment and no tourists should be allowed to visit there; II. 'Scientists have caused more environmental problems than sealers on Macquarie Island and elsewhere'; III. 'Global Warming is merely part of a natural long term cycle of increasing and decreasing temperatures on the earth's surface.'
One Month Journal	Students could write a Macquarie Island Journal over a period of one month. They could choose to write the journal as if they were a convict who had escaped to Macquarie Island, a shipwrecked sealer or scientist, a scientist working on Macquarie Island or a family member of a person who is on Macquarie Island or adopt some other persona.
Telling and Selling Your Shipwreck Story	One group of students could volunteer to be shipwrecked on Macquarie Island. They must agree on the details of the shipwreck (Who was shipwrecked? Did anybody die? When did it happen? Where did it happen? What happened? Why did it happen? How did they eat? How did they find shelter? How did they get home?). These students are then invited to write their account of the shipwreck for the media (in return, of course, for a large sum of money...). The remaining class members are journalists. They will need to decide what type of magazine or newspaper they are working for, who are their readers, and how they should present their stories. The journalists arrange a media conference to interview the shipwreck survivors. The journalists then draft their account of the shipwreck story, hand over the draft to a 'sub-editor' and present a finished copy of their work for publication.
Non-Metric Measures	Working individually or in groups, students could design imaginative ways to explain to the class some non-metric measures that were in common use in the nineteenth century and may still be in use today. Examples of these measures are: pounds, shillings and pence, bushels, fathoms, feet, horsepower, fathoms, knots, feet, inches, pints, tuns, tons and tonnes. It would be useful for students to visit the glossary before attempting this activity.
Charting the Weather	Using Internet data on the Antarctic Division's Macquarie Island website at: http://www.antdiv.gov.au/stations/macca/video.html Chart Macquarie Island's weather over an agreed period of time.
Ship Building	Undertake any or all of these activities, working independently or as a team member: I. Use information from books, the glossary, the ships data-base, the Internet or other sources to make scale paper cut out models of different types of sailing vessels such as brigs,

	barques, schooners, etc. Use grid paper to make these models to scale; II. Use the grid to convert non-metric dimensions (feet and inches) to metric dimensions; III. Build actual models to the dimensions of the paper models; IV. Design and carry out experiment to see which of these vessels are the most efficient at sailing; Explain your results to the class and justify your conclusions; or: V. Write an article on the shipbuilding industry, from bark canoes to nuclear warships.
Subantarctic Plants and Animals	I. Read the stories in The Science Observer, then choose one species of plant or animal that is found on Macquarie Island. Use information from a variety of sources (i.e., books, the Internet, CD ROMs) and write about its life cycle; or II. Investigate the impact of introduced plants and animals in national parks. Find two different ways to present this information to the class.
Winds and Currents	I. Investigate the currents and/or the winds in the Southern Ocean; or II. If students live near a river or the sea they could investigate local currents. They could do this by sending out messages in bottles, asking people who find them to contact you and say where they found the bottle. Students could then map where the bottles were found over a period of time. Present this information to your class.
Navigation at Sea	Research the history of navigation at sea. Teachers could encourage students to look at navigation methods used by non-Anglo cultures, for example, Polynesian, Indonesian, Chinese or Vikings. They could also look at instruments used to navigate and explain to the class how these work.
History of Communications	Investigate the history of communications, from hand signals to satellite signals. Students could present a written and practical demonstration of their research to the class.
Humans - Environmental Vandals or Guardians?	'Some human cultures are better than others at looking after their environment'. Research and report on this topic. In your report, include at least two case studies of how some human cultures have driven other species to extinction.
Whaling and Sealing Industries	Use various sources (i.e. books, Internet, Shipwrecks, Sealers and Scientists on Macquarie Island site) to investigate the whaling and sealing industries. Use drama, music, art or craft to present your information to the class.
Careers in the Antarctic	Investigate the range of careers in the Antarctic and subantarctic since the early 1900s. Present two or three case studies of careers in the

and Subantarctic, Past and Present	Antarctic or subantarctic. If possible, students could interview with people who have worked in the Antarctic or subantarctic and map the locations where these people have worked.
Timeline	Using the stories and information in the Shipwrecks, Sealers and Scientists on Macquarie Island Internet site, students could decide on which events they would consider to be the 20 most important events in the island's history, and chart them on a timeline. They should justify their selection of these events.
Nautical Themes	I. Research the history of a local shipwreck; II. Investigate and report on nautical terms and superstitions; or III. Research the history of the use of knots on ships and give a practical demonstration to your class.
Poetry and Sea Shanties	I. Write a poem about Macquarie Island. Edit the poems and publish as a class anthology; or II. Using the Internet and/or books, investigate the history of sea shanties and either put together a tape of shanties or publish as an anthology.
Filmscript	Students could write a one page outline for a feature film or documentary based on Macquarie Island. They are trying to sell this story to a film producer and must convince him/her to fund your film.
Ship-Board Diets	Use books, the Internet or other sources to investigate: I. Links between diseases such as scurvy and ship-board diets of the past; or II. Factors influencing human diets in Antarctica and the subantarctic. Write a report on your findings.

(Adapted from PWS 2005)

Appendix 13: Other Marine Education Programs Currently Offered by Governments' Agencies

Program Title	Responsible Agencies/Audience	Activities
Victoria		
Summer by the Sea Activities Program	DSE (Coast Action), Parks Victoria, Queenscliff MDC and Melbourne Aquarium/Public	This program provides opportunities to discover and explore the fantastic array of marine life living just below the surface of our marine water in January.
Recreational Fishing Grant Program	DSE/Recreational fishers and the public	The program comprises four project categories including: Recreational fisheries' sustainabilities; Recreational fisheries-related education, information and training; and, Recreational fisheries research.
Marine and Coastal Ecology Course	DSE/Park managers and key decision makers for the coast	5-day intensive course of ecology of coastal environments.
Interpretation Training	DSE (Coast Action/Coastcare) and Parks Victoria/Coastal volunteers and tour operators	Workshops for learning how deliver important messages through many activities that are offer particularly during the Summer by the Sea program.
Environment Corps	Parks Victoria/School students	This program focuses to develop links between parks and young students in Victoria. The program was originally created as part of the Department of Education's Victorian Youth Development Program. Through this program, students can deepen their knowledge and experience of natural habitat monitoring and rehabilitation. Assistance material is also fund on the Internet.
Sea Search Program	Parks Victoria/Public	This program has been undertaken by Friends and community groups of MPAs. It helps the management of Victoria's MPAs by providing scientific and biological data through surveys. This program also assists in raising community awareness of the local marine environment.

Tasmania		
Coastcare Week	DPIWE/Public	Forum and coastal and marine quiz night
Sea Farers Festival	DPIWE/Public	Displays

(Adapted from DSE 2005; Parks Victoria n.d.; Fazackerley, pers. comm., 2005)

Appendix 14: Marine Education Programs Currently Offered by the Gould League of Victoria

Program Title	Area	Activity	Location and Cost
Beach Secrets (Grade 1-2)	Science, Study of Society & Environment (SOSE)	Discover the delights of the sea and help to keep the underwater kingdom clean. Programe Details - "Introduction": Brief safety talk and a drama activity. The drama activity focuses on how litter can harm sea creatures. "High Tide Ramble": A beachcomb along the high tide region where many fascinating seagrasses, seaweeds, sponges, sand hoppers and shark egg cases can be found. Just to mention a few! "Low Tide Ramble": A beachcomb along the water's edge. Students may observe fish and find out what sea worms' homes look like. "Rock Platform Ramble": Students will explore the fascinating world of life in the intertidal zone. Discover crabs, sea-snails and other animals and plants that make the rocks their home. "Sea treasures": Students look at, touch and learn about some fascinating beach washed treasures. "Beachcomber": Students will search for their own exciting treasures newly washed onto the beach by the last high tide! "Live sea creatures up close": Students will see some live sea creatures and discover some of their amazing adaptations to coastal survival. "Easy student project": Students will design an individual stencil for the stormwater drains at their own school.	Locations: Rickett's Point, Beaumaris (Port Phillip Bay) Balnarring Beach, Balnarring (Western Port Bay) Williamstown. Cost: $7.90 per student (half day program).
Octopus's Garden (Grade 3-4)	Biological Science (Living together: past, present & future, Structure & Function) Society &	See sea creatures and discover what special features they have to survive and experience the diversity of the coastal environment through a range of hands-on and thought-provoking activities. Explore the rock platform to find out what lives there and see some live rockpool creatures up close. Discover just how connected we are to the sea. Programe Details – "Introduction": Welcome and Safety brief Sea treasures. Students look at, touch and learn about some fascinating beach washed	Locations: Rickett's Point, Beaumaris (Port Phillip Bay) Balnarring Beach,

	Environment Australia's people & places	treasures. "Shell Study": The students investigate the different types of shells and discover what a shell really is. "Beachcomber": Students will search for their own exciting treasures newly washed onto the beach by the last high tide! "Live sea creatures up close": Students will see some live sea creatures and discover some of their amazing adaptations to coastal survival. "Rock platform discovery": Students will explore the fascinating world of life in the intertidal zone. Discover crabs, sea snails and other animals and plants that make the rocks their home. "Litter in the marine environment": Focus on how litter affects the marine environment. "Beachcomber": Exploration, Discovery and Discussion. Students will, look, touch, feel and smell some fascinating beach washed treasures and then go and search for their own! "Live sea creatures": The students will be able to observe up close a wide variety of live sea creatures. Learn about adaptations and structures and how they survive in their tough environments. "Tidal Walk": A beachcomb along the high tide and low tide areas. Students will discover some interesting facts about the molluscs and other sea creatures that live there. Seaweed/sea grass focus. "Fatal Food Relay": A fun game focusing on litter and the marine environment. Students will discover some of the effects pollution has on sea creatures. What's The Problem? A small group activity that focuses on how the beach environment is used as a different resource by different people. "Environmental Bingo": A fun activity that involves a close-up focus on the flotsam and jetsam found on the beach. "Easy student project": Students will design an individual stencil for the stormwater drains at their own school.	Balnarring (Western Port Bay) Williamstown. Cost: $7.90 per student (half day program).
Tidal Survival (Grade 5-6)	Biological science (Living together: past, present and future,	Examine the coastal environment and discover how plants and animals have adapted. Consider the changes over time along the coast and in the bay. Look at some litter and find out what we can do to take care of the marine environment and view some live rockpool creatures up close! Programe	Locations: Ricketts Point (Beaumaris, Port

	Structure & function) and Geography.	Details: Introduction: Welcome and Safety brief Coastal Vegetation: An exploratory guided tour to discover the adaptations that plants need to survive on the coast. Live Creatures: The students are able to closely observe live specimens. The focus is on adaptations and structures of the marine creatures. (This activity will be dependent on the availability of sea creatures on the day). Rock Platform Ramble: The students will discover some of the sea creatures and plants that live in the intertidal zone. They will look at adaptations and survival methods. This session includes a shell study. Change over time: The students will become aware of how Port Phillip Bay has changed over geological time. They will role-play an activity that shows how different people used the bay at different times. Pollution and the marine environment: Students will view the Supaloo of the future and become aware of how their actions at home can affect the marine environment. Coastal Vegetation: An exploratory guided tour to discover the adaptations that plants need to survive on the coast. Tidal Walk: Students will discover some of the sea creatures that are able to survive in the intertidal zone. They will look at adaptations and survival methods. Focus will be on molluscs. Easy student project: Students will design an individual stencil for the stormwater drains at their own school.	Phillip Bay); Balnarring Beach (Western Port Bay); Williamstown. $7.90 per student (half day program).
Bringing the beach to you (Primary to Grade 6)	Biological Science, SOSE, Australia's People & Places	Visit your school so students can discover some of the amazing treasures of the sea without getting wet. See live rockpool creatures under our amazing video microscope and find out how they survive. Examine seaweed, shells, and some unusual items you might find on a beachcomb ... which of these things really do belong on the beach. (This program is a half day program, available terms 2-3)	$7:90 per student. Locations: At a school.
Holiday Program -	NA	"Introduction": Brief safety talk and a drama activity. The drama activity focuses on how litter can harm sea creatures. "What's the problem?" A small group activity that focuses on how the beach	Location/s: Rickett's Point

Watery World (All school students)		environment is used as a resource by different people. "Touch Tank": Students observe live specimens. They will learn about adaptations and structures of the sea creatures (Ricketts Point only). "Environmental Bingo": A fun activity that involves a close-up focus on the flotsam and jetsam on the beach. "Beachcombing": Students will touch, feel and smell a range of beach-washed treasures and then see what they can find. "Rock Platform Discovery" This includes a beachcomb along the high tide and low tide areas. They will find and discover some interesting facts about the sea creatures that live here like sea snails and crabs! Plus marine-based, fun environmental games.	(Beaumaris) OR Balnarring Beach (Balnarring) Cost: $7.90 per student.

(Adopted from Gould League of Victoria 2005)

Appendix 15: Marine Education Programs Currently Offered by the Melbourne Aquarium in Victoria

Program Title and Suitable Age	Activity Details
Touch, Tickle and Taste: All	The program has been designed by experienced teachers of special settings in consultation with the Underwater Zoo Education Service. Students are introduced to the underwater world during 30-minute classroom session. The aim of the classroom experience is: to introduce students to some of the experiences that they have out in the Aquarium and to provide a range of experiences that will utilise different senses and provide opportunities for both group and individual participation. This session will involve a team teaching approach between the aquarium educator and the special settings teacher of the group. These will be set up around the classroom and can be used in different ways. They can be used as a series of stations, in-groups or as individuals. The following range of activities is offered during the classroom session: fishing with magnets; searching through sand and/or cellophane for artefacts. This is designed to be an introduction to putting hands underneath the water. (seaweed and salt water tasting; dress ups - flippers, snorkels, masks, blow - up swimming accessories, fish costumes; listening to underwater music; matching mat with picture communication cards; large jig saws; food chain puppets; picture books; touchy feely box with artefacts; water experience with a basin of water and aquatic toys). "Self-Directed Aquarium Trail": the self-directed trail through the Aquarium. It is led by the special settings teacher and carers. The aquarium educator will not accompany the group during this part of the program. Interpretive Staff who are located around the Aquarium are always available and happy to help with any inquiries or directions. It allows teachers and carers to use the props from their trail bag as appropriate for their students. The trail bag is a simple cloth shoulder bag containing a range of picture communication cards and artefacts. (Refer to accompanying trail notes). The program invites students to look closely at the animals. This may involve careful touching of some animals underwater in the rock pools with supervision of Aquarium staff. It may involve an encounter with divers underwater in the Southern Ocean tank cleaning or feeding sharks, rays and other creatures of the deep. The program also provides a wealth of sensory stimulation and allows the group to take their own time throughout the Aquarium.

Watery wonders: Early Childhood Program (aged 4-5)	Learning becomes a wondrous adventure with the Early Childhood Program at the Melbourne Aquarium. Young children aged four and five years old are invited to discover a wealth of aquatic life with the Underwater Zoo Aquarium Education Service. "The Underwater Zoo Session": The play based learning experiences in the Education Room: are led by an experienced Early Childhood Educator for 45 minutes; introduce children to the aquatic world through interactive activities; encourage children to create, imagine and dramatise; give children the opportunity to express their ideas, feelings and attitudes. "Aquarium Trail Session": The trail through the Aquarium: is led by an Aquarium educator for 45min and is then self-directed; provides the children with a variety of informal experiences; gives children the opportunity to meet aquatic creatures close up and explore their habitats, including a coral atoll, mangroves and a billabong; invites students to look closely at the features of the rockpool animals, and this may involve careful touching of some animals underwater; may involve an encounter with divers underwater in the Great Southern Ocean tank feeding sharks, rays and other creatures of the deep; provides a wealth of sensory stimulation; and allows the early childhood educator to extend the aquarium experience back in his/her own centre.
All Underwater Zoo: Early years, Middle years, Later years	This program is fully supervised by the Aquarium Educators. In all programs students will be taken through a complete learning process. This includes gathering information, comparing and contrasting, analysing, synthesising and finally asking the 'what if' questions of hypothesis. These 2-hour programs are based on the Curriculum and Standards Framework (CSF) II and cater for all education levels. All programs are interactive and activity-based and have been developed by qualified and experienced teachers. All programs have pre-visit and post-visit activities available online.
Victorian Certificate of Education: Teachers	Marine biology, chemistry and environmental science. Unit 1: Organisms in their environments (the nature and changes in ecosystems). Unit 2: Functioning organisms (requirements for life and reproduction and development). Unit 3: Biological continuity and change (Variation, natural selection and evolution).

Professional Development for Teachers	1. "Underwater Zoo Primary Program Previews": Primary teachers are invited to join the Underwater Zoo Education Team for a preview of Primary Programs (Prep – Grade 6). Participants will have the opportunity to investigate pre and post-visit activities and take part in a guided tour throughout the Aquarium. 2. "Underwater Zoo Secondary Program Previews": Secondary teachers are invited to join the Underwater Zoo Education Team for a preview of Secondary Programs (Grade 7 – Victorian Certificate of Education). Participants will have the opportunity to investigate in pre and post-visit activities and take part in a guided tour throughout the Aquarium. 3. Engaging Science (Years 7-10) 4.Science and Literacy (Prep - Grade 4).
Aquarist for a day (Special Program)	This program provides students with the opportunity to experience life as an aquarist for a day during the school holidays. During the program, students will undertake a range of activities including water testing, food preparation, animal feeds and interpretive duties. All activities are fully supervised by Aquarium staff.
Aqua Arts: Term Four 2005 (Special Program)	Vicki McConville is a well-known multi-award winning Australian artist, whose work has been included in countless exhibitions nationally and internationally spanning the last 20 years. She specialises in digital prints, printmaking, sculpture, photography and film. Vicki has been on a number of prominent Arts Boards including the National Association for the Visual Arts and the International Digital Art Award. Vicki will encourage students to record patterns and colours and to observe and describe textures of various marine life throughout the Aquarium. Using a combination of these photographs and collages created by students on the day, Vicki will produce a series of 'magic mirror boxes or dioramas that reflect the way in which students and Vicki were inspired during their time spent within the Aquarium.
Seaweek 2005: 6-13 March. (Special Program)	Melbourne Aquarium has been run its Seaweek Banner Competition in association with MESA. The aim behind Seaweek is to inspire and increase awareness of our oceans. In 2005, the theme of 'Save Our Sharks' was very popular with students and went hand in hand with the Grey Nurse Shark Recovery program currently being carried out here at Melbourne Aquarium. Over 30 schools and 800 individual banner entries were received this year.

Shark Conservation (Special Program)	Melbourne Aquarium, in association with Monash University and BHP Billiton, has recently trailed what is thought to be a world-first technique to artificially inseminate a Broad Nosed seven-gill shark. It is hoped the technique can be used in the future to preserve endangered species, such as the Grey Nurse shark. After monitoring male and female seven-gill sharks for up to two years, a team of Monash University researchers and Melbourne Aquarium marine scientists performed the insemination. The success or otherwise of the insemination is expected to be known. Melbourne Aquarium is home to Victoria's only known Grey Nurse sharks, which are critically endangered and have not lived in the state's waters since the 1960s. The newly completed technique gives hope that one day it may be possible to re-populate the Victorian coastline with these awesome creatures.
Careers Day 2005/06 (Special Program)	(Careers Day Highlights Semester Two 2005) Brett Tunstall (Customs) and Wendy Roberts (Reefwatch) explore marine science careers with 35 enthusiastic and committed students from all around the state. Brett spoke about the diversity of roles possible for graduates including his own position regulating the import and export of wildlife into and out of Australia. Wendy spoke primarily of the need for students with passion to persevere and use volunteer positions to gain experience in their chosen field. Students then had an opportunity to 'reefwatch' the aquarium under Wendy's guidance.
Work Experience (Special Program)	Melbourne Aquarium takes many work experience students annually. Any relevant volunteer work or related experience should be presented.

(Adapted from Melbourne Aquarium 2005)

Appendix 16: Marine Education Programs Currently Offered by the Dolphin Research Institute

Program Title	Areas	Activity	Other Information
"Wally the whale" and other stories (CSF 1: Caring for our environment).	Studies of Society and the Environment (SOSE) /Science (Animal Survival, Behaviour, Biodiversity, Conservation, Environments, The Sea/Oceans).	Students will be taken on a journey into the dolphins' world in the Dolphin Research Institute's theatre. Stunning images, sounds, displays and role-play activities will be used in an entertaining way to help students understand the lives of our dolphins and our wonderful local marine life. The true story of "Wally the whale", an orca found to have ingested numerous garbage bags, will be told in a theatrical manner to demonstrate the impacts we can have on the marine environment. (A maximum number of 45 students can be accommodated for this program if run as an excursion.)	Location: Indoor activity in the theatre of the Marine Conservation Centre. Duration: 60 minutes.
"Don't pee in our pool!" (CSF 2: Caring for our environment).	SOSE/Science/Health and PE (Animal Survival, Behaviour, Biodiversity, Conservation, Endangered Species, Environments, The Sea/Oceans).	From land, the sea is nothing more than water, sand and seaweed (and the odd dolphin if you're lucky!). This program introduces students to marine biodiversity in Victoria through colourful sights and fascinating specimens in the Dolphin Research Institute's theatre. Students will be taken on a journey into the dolphins' world in an investigation into life under the surface. Stunning images, sounds, displays and role-play activities will be used in an entertaining way to help students understand the lives of our dolphins and the wonderful local marine life. To be responsible is the essence of this program. Fun, excitement and a little bit of magic are used to remind students that rubbish dropped in the schoolyard doesn't disappear. A hands-on stormwater drain construction activity investigates the fate of litter once it is picked up by the wind and rain. We then take a short walk to a real stormwater drain and trace its path through	Location: Indoor activity in the theatre of the Marine Conservation Centre plus outdoor activity on the lawns of the Western Port Marina. Duration: 120 minutes.

		saltmarsh and mangroves, out into the sea, discussing our impacts on the sea and its inhabitants along the way. How heavy? The one time it's okay to litter!	
"Please don't eat me!" (CSF 3: Marine food chains).	SOSE/Science (Animal Survival, Behaviour, Biodiversity, Conservation, Endangered species, Environments, Food webs/chains).	Although closely related, dolphins and whales differ in what they feed on and how they obtain their food. Whilst using whales and dolphins to illustrate simple food chains, specimens and role-play activities are used to demonstrate differences between these marine mammals. Feeding behaviour across different life stages of dolphins is also discussed. At first glance, wetlands may look unappealing and a waste of space, but they are of international ecological significance and are home to a diverse range of rare and endangered species, including migratory birds. They also have a key role in filtering water run-off from the land, keeping the marine environment clean and healthy. "Please don't eat me!" considers how this natural functioning of the wetland ecosystem has been altered through the development of the stormwater drain system. We start at the beach and work our way back inland to discover the origin of a small creek that meanders through the wetlands - a stormwater drain outlet - discussing our impacts on the sea and its inhabitants along the way. If the students are quiet enough, they may be lucky enough to see some soldier crabs playing in the mud! Role-play to learn about feeding behaviour. The impact of pollution on food chains is illustrated in a game that uses seagrass and dolphins as the focus and demonstrates the effect of habitat loss on the survival of fish species. A game of survival for the "fish". We take a look at a real stormwater drain outlet that runs out into Western Port.	Location: Indoor activity in the theatre of the Marine Conservation Centre plus outdoor activity on the lawns of the Western Port Marina. Duration: 120 minutes.
"i sea, i care": School	SOSE/Science	How does the project work? - A school will select 3 ambassadors to represent your school (1 teacher and 2 students: Grade 4-6). The Institute will provide your Ambassadors with a monthly	

Ambassador Project (A unique opportunity for your school to show leadership and initiative within your community.)		insert for your school newsletter. This will focus on an issue within our marine environment and provide you with a "pin up" of one of Victoria's living marine treasures. Inclusion of this in your school's newsletter on a monthly basis is the only commitment that we ask of your school. - School ambassadors will be invited to attend a workshop each term. The workshops are organised by the Institute to excite and motivate school ambassadors and teach them more about issues affecting our marine environment. These workshops are not compulsory, however, they are a great tool to meet other ambassadors and excite school representatives by sharing other schools' projects, incentives and achievements. Workshops may not be available for some regional areas.	
Incursions - "Yes," we can come to you!	SOSE/Science	The Institute's educators will provide school students with: An inspirational slide show presentation about dolphins and the broader marine environment and role-play activities.	

(Adapted from Dolphin Research Institute n.d.)

Appendix 17: Marine Education Programs Currently Offered by the Friends of the Bluff in Victoria

Activity Title and Suitable Grade	Activity	Objectives and Key Outcomes
Shell Classification (Biological Science: Classification Activities) Year 5-8	The purpose of this activity is twofold. Used at the beginning of the year, it introduces the structure and function of a dichotomous key preparatory to asking students to identify plant and animal specimens. It also reinforces the idea that there are many "right" answers in science. NOTE: There re many different ways to classify organisms. Encourage lateral thinking for the most quirky keys.	To classify "specimens" according to observable characteristics. To name the different specimens so they can be identified in their classification system. To prepare a "key" showing their classification system. To use their key to identify a specimen. To recognize the validity of classmates' classification systems.
Identifying Algae (Biological Science: Classification Activities) Year 7-8+	What you do: Take care while doing this activity that you do not slip on rocks covered in algae. Don't pick up a large clump of seaweed on the beach without shaking it first to dislodge any stinging jellyfish, syringes, or glass. As this key has been developed for temperate and sub-tropical Australian shores, it may not contain all tropical algae. Work in small groups or pairs to locate algae. Some may be on rocks and in crevices; others may be floating in the sea, or washed up on the beach at the high tide mark. It is not necessary to always pick individual alga (the singular of algae). Biological keys rely on a logical procedure to review certain characteristics and eliminate some which do not relate to one	Identify the features of algae that determine their classification into major groups.

	species. Work through the keys provided and name your sample specimens. Consider your data: how many different algae did you find? Where were most located? Which was the smallest one? Which was the largest? Which is the dominant colour? Are there any algae which you could not key out and identify? Extensions: You could do the "Algal Pressing" activity, and the "Red Algae Bloom". The latter looks at a problem associated with there being too much of one type of alga.	
Quirky Questions Activities (Biological Science: Conservation Activities) Grade: Not specified	To examine the Quirky Questions. Always treat marine creatures with respect! Protect our creatures - always put rocks back as you found them. Never put your hands anywhere you can't see. You never know who might be hiding there! Never take any creatures away from their natural environment. They will die! Be careful where you put your feet always try to stand on bare rock or sand. Feet can be lethal weapons! Be careful what you put down drains as the Bluff creatures may end up living in it.	To promote responsible reef behaviours.
Commercial Mollusc Fisheries (Biological Science: Conservation Activities) Year 4-5	Choose two of the following commonly farmed molluscs: Abalone, Blue mussel, Pacific oyster, Sydney rock oyster, or Scallop. Carry out library research to determine the answers to these questions: Where is this mollusc found in the local area? Show on an appropriate map. Describe the life cycle and habitat of the chosen species. How are these species farmed? Describe the production process from early larval stage to fish shop/supermarket. Who is the target consumer? (export fresh, local fresh/frozen, canned, smoked etc.) Is the shell used? For what? What current and potential environmental problems exist? What management controls exist for the chosen species? What management controls should be in place? Students should each choose a shell. Put it under a blank sheet of paper and gently rub over the top with a pencil/crayon to produce a textured shell rubbing. Display as a collage within the classroom. <Extension> Buy some of the molluscs and learn how to	To develop an understanding of commercially important fishery stocks.

	prepare them for eating. Go on to a rocky platform and make a specific search for molluscs, using one of the field methods described in "Field Methods". Observe the differences between the live and dead mollusc shells. Suggest reasons why we can't just "farm" molluscs from rocks.	
Rock Platforms: a Different Approach (Biological Science: Ecosystem) Year 4-8+	1. Select a rough pathway to form a transect that commences at the top of a beach (or, if circumstances allow, a catchment of a creek running onto the beach), and continues across the rock platform down to the sea bed. 2. Note the major features of your transect as you walk down it. Identify plants and animals using a field guide, or merely note the variety (e.g. scrub, low plants and reeds, grass tussocks, burrows, bare rock on slope, boulder field, rock platform with numerous molluscs and invertebrates, steep drop off into sea).	Encourages students to look at interpreting a rock platform in the context of how it relates to and is part of adjacent terrestrial and marine ecosystems.
Diversity Indices as an Educational Tool (Biological Science: Ecosystem) Year 10	This field study uses a standard transect to find out about different habitats and the bird species in these. Then, the bird species are used as indicator species to prepare an index of diversity to allow comparisons between different habitats. If time is short, the habitat (or vegetation) can be quickly assessed and two or more contrasting areas used to prepare the list of bird species. What each group does 1. Habitat study 2. Transect vegetation survey 3. Using indicator species to measure diversity 4. Bird count	Understanding of biodiversity. Use qualitative scientific methods to evaluate biodiversity.
Multiple Personalities? (Biological Science: Survival) Grade: Not specified	Activity 1: Imagine you are going to spend two weeks in the cliff environment on the right. What would you need to take? Students work in groups and list items. Share and discuss the lists. Repeat the procedure for an under sea environment. Compare the lists and look for similarities. Discuss the difference between needs and wants. Make a list of the essentials needed to survive. Activity 2: Test your hypothesis. Using the list made in Activity 1 see if the same things apply to a crab, seaweed, or a fish. Evaluate and modify your hypothesis.	To think about and imagine to spend certain period in the cliff environment on the coast.

What is Sand? (Earth Science) Year 2-3	Students can work in pairs or small groups. Collect the appropriate equipment. Each group goes to a different site up a beach, some close to the water, others at the top. Each group does the same field work. (1) Collect a small amount of sand. (2) On a sheet of paper carefully separate some particles or use a sieve to separate the particles and sort them into the categories below. You need patience! (3) Use a magnifying glass to examine the samples. What do you observe? What else did you find in your samples of sand? Can you identify these? Are they are all natural items or are they from human activities? Where do the stone particles come from? Are they rough feeling or smooth? How do they become smooth? (4) Lightly smear some glue onto the field sheet and sprinkle on the sample, one box at a time. Or you can use clear contact and sprinkle the particles onto the paper first then cover with a square of contact to hold them in place (see accompanying field sheet). <Discussion> Compare samples between groups from various places up the beach. Are there differences in the grain size and composition of the sand? You may also be able to compare a small collection of sand from different beaches.	Describe the features of sand found at different places.
Tides Sequence (Earth Science) Grade: Not specified	Browse the Tidal Comparisons photo gallery. Using this and the knowledge gained in previous activities students can write a report on their understanding of tides, draw a cartoon style representation or make a working model, to demonstrate their understanding. Students can use drawings or computer software.	To understand about tides.
Tides Sequence (Earth Science) Grade: Not specified Year 5-6	Browse the Tidal Comparisons photo gallery. Using this and the knowledge gained in previous activities students can write a report on their understanding of tides, draw a cartoon style representation or make a working model, to demonstrate their understanding. Students can use drawings or computer software.	Describe and monitor wave action.

What's That You Say?? Marine National Parks for Victoria - Analysing the Opinions Media Analysis (Cross-Curriculum Activities) Grade: Not specified	Students have been provided with a copy of a number of newspaper articles that appeared through the two years that led up to the declaration of the Marine National Parks and Marine Sanctuaries in Victoria. These are in the file called Marine National Parks News Items 2002 - 2001. During this and preceding times there was considerable debate in the community as to he values of the Marine National Parks system and the impact it was likely to have on the lives of coastal people. Use the Articles provided to develop a summary of the different perspective's expressed by different parts of the community. What were some of the main arguments from; The Government, Conservation Groups, Commercial Fishers, Recreational Fishing groups, The Seafood Industry, Scientists. (1) Use these arguments to develop a Marine National Park debate. (2) Use these ideas to have a go at the Marine National Park auction activity.	Media analysis
People Working with Oceans (SOSE) Year 1-8	Many people in Australia have skills associated with the sea, and work in it. You should be able to arrange to visit at least one of the sites listed above, and talk to the workers. Some of these may be able to talk to the whole class group at once; then students can interview workers. Prior arrangements are essential if work is to be interrupted. One of the best sequences is to go early to the fish market, attend an auction, then visit a seafood restaurant, or buy some fish and return to school and learn how to gut, scale and cook them. (1) List all the jobs associated with the ocean and coastal areas. (2) Do you know of anyone doing these jobs? 3. Visit to the Fish Market. Find out: where is it located; what are the buildings made of; what does it smell like; is it noisy; is it messy; what is the daily life of the people; do they have to get up early in the morning?; what sort of work are they doing; what types of fish do you see; what other sea creatures, for example, squid, shell fish, prawns, etc.? (4) What happens when the fish are purchased. Where do they go? How are they packed?	Understand some of the work of and attitudes held by people who earn their living from the ocean.

Sand Sculpturing (Arts activities) Year 1-8	Select an area of beach which will not be inundated for an hour or so. Sand sculpturing allows you to create and express your feelings about the beach. It can be done by individuals or small groups. Decide what you are going to sculpture: familiar, original, bizarre, fantastic, humorous, beautiful, geometrical, mysterious, silly, puzzling? Create it with equipment and/or your hands. You can try dribbling wet sand on what you have made. You can decorate your creation with shells, pebbles, sea plant material, cuttle fish bones, feathers or whatever is available along the beach. You might decide to avoid the use of anything not natural. Once all groups are finished, do a tour of the sculptures. Creators can explain their creation to the rest of the group. Watch what happens when the tide comes in! Extension: Do "What is Sand?" activity unit.	Express ideas by creating a sand sculpture on the beach.

(Adapted from Friends of the Bluff n.d.)